NURSES' WORK AND HOW IT IMPACTS HIV OUTCOMES IN NAMIBIA

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ABSTRACT

Gillian Izabelle Adynski: Nurses' Work and How it Impacts HIV Outcomes in Namibia
(Under the direction of Cheryl B. Jones)

This three-paper dissertation examined the relationships among nurse staffing, nurse attitudes, and organizational outcomes for nurses working in outpatient settings in Namibian public health facilities. Guided by the job resource-demand (JD-R) model (Bakker & Demerouti, 2007), the dissertation used a multi-method approach to explore different aspects of the model. Paper 1 (Chapter 2) presents the findings of a scoping review of the literature conducted to understand the relationships among adequate nurse staffing (conceptualized either as a job demand or as a resource), nurse attitudes (including burnout, motivation, etc.), and organizational outcomes (to include patient outcomes) in outpatient settings. Paper 2 (Chapter 3) presents a secondary analysis of data gathered in 73 Namibian health care facilities to examine, through a Poisson regression, the relationship between nurse staffing and two key organizational outcomes of HIV care, Viral Load Documentation (VLD) and Viral Load Suppression (VLS). Paper 3 (Chapter 4) presents a directed content analysis of qualitative interviews with Namibian nurses to examine how they perceive job attitudes, how job-related factors affect their job attitudes, and how their job attitudes affect their ability to do their jobs well.

The findings from the scoping review in Chapter 2 indicate that, when nurse staffing is measured by a variety of measures, higher levels of nurse staffing in outpatient settings improved several organizational outcomes, including chronic disease management, nurse turnover, and

costs. Nurse staffing was also associated with nurse attitudes, and nurse attitudes were associated with improved organizational outcomes. The findings of the quantitative analysis presented in Chapter 3 indicate a positive relationship between nurse staffing, measured using the workload indicator of staffing needs (WISN) ratio, and VLD. The findings indicated no significant relationship between nurse staffing and VLS. The findings of the qualitative directed content analysis presented in Chapter 4 indicate that nurses perceived job attitudes encompass the following themes: empowerment, motivation, pride, satisfaction, burnout, dissatisfaction, and frustration. Also, the nurses in my sample indicated that job-related factors, personal factors, and patient outcomes influenced their job attitudes. Nurses also perceived that their job attitudes affected their ability to do their jobs well.

The findings of this dissertation point to implications for future research, theory, practice, and policymaking that will support nurses' ability to deliver HIV care to patients in Namibian outpatient settings. The findings also indicate that investments in these areas could improve nurse attitudes and nurses' ability to do their jobs well and would likely enhance patients' access to HIV care in Namibia.

This dissertation is dedicated to all the children around the world struggling with dyslexia.

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LIST OF ABBREVIATIONS

ART	Anti-Retroviral Medications
CAF	Categorical Allowance Factor
CAS	Categorical Allowance Standard
CDC	Center for Disease Control and Prevention
CHC	Community Health Center
COPD	Chronic Obstructive Pulmonary Disease
EHP	Emergency-Hire Nursing Program
EN	Enrolled Nurse
FTE	Full Time Equivalent
FY	Fiscal Year
HIV	Human Immunodeficiency Virus
HPPD	Nursing Hours Per Patient Day
IAF	Individual Allowance Factor
IAS	Individual Allowance Standard
ICN	International Council of Nurses
IRB	Institutional Review Board
JD-R	Job Demand-Resource Model
LIS	Laboratory Information System
LPN	Licensed Practical Nurse
MoHSS	Ministry of Health and Social Services
NA	Nursing Assistant

NAD	Namibian Dollars
NGO	Non-Governmental Organization
NHIES	Namibia Household Income and Expenditure Survey
NIMART	Nurse-Initiated Management of Anti-Retroviral Therapy
NP	Nurse Practitioner
PCP	Primary Care Provider
PEPFAR	President's Emergency Plan for AIDS Relief
PES-NWI	Practice Environment Scale of Nursing Work Index
PI	Principal Investigator
RN	Registered Nurse
UNAIDS	United Nations' Program on HIV/AIDS
UNC	University of North Carolina at Chapel Hill
USAID	United States Agency for International Development
UTAP	USAID HIV Clinical Services Technical Assistance Project
UWES	Utrecht Work Engagement Scale
VA	Veterans Affairs
VLD	Viral Load Documentation
VLS	Viral Load Suppression
WHO	World Health Organization
WISN	Workload Indicator of Staffing Needs

CHAPTER 1: INTRODUCTION

Nurses are the largest segment of the health workforce, making up almost half, or 20.7 million, of the 43.5 million health workers worldwide (Crisp, Brownie, & Refsum, 2018). Unlike other health-professional groups, nurses uniquely focus on holistic, preventative care and patient-centered care through their education and training, and their services are cost-effective and of high quality (Crisp et al., 2018). With the global emphasis on preventative care, health promotion, and wellness, investing in the nursing workforce now is critically important (Crisp et al., 2018).

Unfortunately, because of a severe shortage of nurses, many countries around the world cannot provide needed preventive care, health promotion care, and wellness care. One of the biggest concerns associated with a shortage of nurses is the potential impact on nurse-staffing levels across different health care settings. When there is a shortage at a global or national level, health care facilities, nursing units, and wards are often left understaffed, pushing nurses' workloads higher and making it increasingly difficult for nurses to deliver needed patient care.

Poor nurse-staffing levels are amplified in geographic areas across the world that have high-disease burdens. Sub-Saharan Africa is one such area, accounting for 24% of the world's disease burden but only 3% of the world's health care workforce (Guilbert, 2006). For example, Namibia, a country in Sub-Saharan Africa, has only 30% of the nursing workforce that it needs to meet staffing demands outside of hospitals, especially in public health centers and clinics (McQuide, Kolehmainen-Aitken, & Forster, 2013). The nursing workforce shortage in Namibia is compounded by the high prevalence of Human Immunodeficiency Virus (HIV) among the

country's population, with approximately 12.6% of the population living with HIV in 2018 (Phia Project, 2018). Without proper nurse-staffing levels, patients may not receive the high-quality care that they need from nurses.

When nurses work in conditions of staffing shortages, their attitudes about their jobs, such as perceived stress and job satisfaction, may be negatively affected, and these attitudes adversely affect patient health outcomes (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). Nurses' job attitudes, or their beliefs about, feelings toward, or attachment to their jobs (Judge & Kammeyer-Mueller, 2012) may manifest as job satisfaction (Chu & Hsu, 2011), organizational commitment (Chu & Hsu, 2011), job engagement (Freeney & Tiernan, 2009), work motivation (Toode, Routasalo, & Suominen, 2011), or burnout (Van Bogaert et al., 2017). Several organizational outcomes have been linked to nurses' job attitudes: higher nurse-perceived quality of patient care (Asiret, Kapucu, Kose, Kurt, & Ersoy, 2017), fewer health care acquired infections and patient falls (Van Bogaert et al., 2017), and fewer medication errors (Nantsupawat, Nantsupawat, Kunaviktikul, Turale, & Poghosyan, 2016). Therefore, achieving positive patient outcomes is dependent on adequate nurse-staffing levels and on nurses' positive job attitudes. Nurses need both to perform at a high level in their work.

This dissertation examined the impact of nurse staffing and nurse attitudes on HIV-related outcomes in public hospitals, health centers, and clinics in Namibia. This research is important because understanding how nurse staffing and nurse attitudes contribute to HIV outcomes can inform leaders as they develop solutions that enable nurses to provide the highest quality care for Namibians who seek HIV services.

Background and Statement of Problem

Namibia is a country in Sub-Saharan Africa that has a population of almost 2.5 million people. The average per capita income is NAD (Namibian dollars) $9,880, with great economic disparities across individuals and groups. Approximately 12.6% of the Namibian adult population is living with HIV, with some regions experiencing rates as high as 23.3% (Phia Project, 2018). Namibia is one of nine countries, along with Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland, Zambia and Zimbabwe, with an HIV prevalence over 10% (CDC, 2017; UNICEF, 2019). In fact, HIV/AIDS is the leading cause of death in Namibia (CDC, 2017).

Although there is no known cure for HIV, once an individual is infected and appropriately treated, they can live a full life with HIV. The goal of HIV treatment is, first, to identify whether an individual has tested positive for HIV and then to get the individual on the proper treatment to suppress their HIV viral load. *Viral load* is a term that indicates the amount of HIV circulating in an individual's blood (AIDSinfo, 2018). To suppress an individual's viral load, the individual takes certain prescribed medications, a regimen known as anti-retroviral treatment (ART). This treatment prevents the virus from destroying the immune systems of HIV-positive individuals. Without this treatment, individuals would be unable to overcome even a minor infectious disease, and would most likely die.

Another important reason that a person living with HIV needs to use ART medications and maintain a suppressed viral load is to minimize the risk of transmitting HIV to HIV-negative sexual partners, to infants during childbirth, or to children during breastfeeding. Therefore, to prevent spread of HIV, everyone potentially at risk of contracting HIV must receive HIV testing and counseling on a regular basis, become aware of their HIV status, and begin ART to suppress

their viral load. Taking these actions will prolong the quality and longevity of life for those living with HIV and will prevent HIV transmission to new individuals.

Namibia is currently addressing its HIV disease burden by working toward the United Nations' Program on HIV/AIDS (UNAIDS) international goal of 90-90-90—that is, 90% of HIV-positive Namibians know their HIV status, 90% of Namibians who are diagnosed with HIV are on ART, and 90% of individuals on ART have a suppressed viral load (UNAIDS, 2014).[1] In 2017, it was documented that 90% of Namibians with HIV knew their HIV status (UNAIDS, 2014).

However, only 84% of HIV-positive adults and children received ART, and only 74% of those who received ART had a suppressed viral load (UNAIDS, 2017a). Thus, there is still work needed in Namibia to achieve the UNAIDS goal of 90-90-90, namely improved HIV testing, counseling, and treatment.

To work toward the 90-90-90 goal, patients must be tested and counseled about their HIV status. Then, a plan must be established for all HIV-positive individuals to begin ART medications. Once on medications, the effectiveness of the medications must be determined by testing patients' viral load. While on ART, Patients must have a viral load documented in their chart at least once every 12 months (PEPFAR, 2017). A viral load is considered suppressed if the virus is below 1000 copies/ml (PEPFAR, 2017).

To implement the steps needed to address the 90-90-90 goal in Namibia, HIV services are needed to treat the high HIV prevalence. Health workers are also needed throughout the HIV treatment to ensure that patients' care is properly managed and to provide high-quality HIV

[1] It should be noted that starting in 2020, the goals have been updated to be 95-95-95 by 2030. However since this dissertation will use data from the year 2018 and 2019, we focused on the 90-90-90 goals, as they were the goals in place at the outset of this dissertation and data collection (UNAIDS, 2015).

services to all Namibians. Viral load documentation (VLD) and viral load suppression (VLS) of Namibians living with HIV are key indicators of successful HIV treatment.

Namibian Health Workforce and Health System

Namibia has approximately three health workers (e.g., doctors, nurses, and midwives) per 1000 population, which is higher than the World Health Organization's (WHO) recommendation of 2.5 health workers per 1000 population (AHO, 2018). The most recent statistics on the Namibian health workforce suggests that there is approximately 1 physician for every 3,000 Namibians and 1 registered nurse (RN) or midwife for every 700 Namibians total in the public and private health sectors (AHO, 2018). In the public health sector alone, however, fewer than 2 health workers per 1,000 population work in Namibia, which is lower than the WHO's recommendation of 2.5 health workers per 1,000 population (AHO, 2018). These statistics highlight Namibia's shortage of public-sector health workers relative to the WHO's recommended number of health workers.

The structure of Namibia's nursing workforce is an important consideration for this dissertation because nurses are key providers of HIV services. The Namibian nursing workforce consists of two categories or levels: enrolled nurses (ENs) and RNs. ENs receive two years of training that culminates in a certificate, which allows them to register as enrolled nurses with the Health Professional Council Namibia (HPCNA) (Republic of Namibia, 2004). The other type of nurses are RNs, who must complete an accredited nursing school program to receive a diploma or degree in nursing. After graduation, these nurses are eligible to register with the Namibian Health Professional Council of Namibia as RNs (Republic of Namibia, 2004). Both cadres are registered with the Health Professional Council of Namibia. RNs provide some supervision over EN practice. Although these two types of nurses are very different in terms of their educational

backgrounds, both types have similar scopes of practice, play very similar roles in HIV services, and have been well-integrated into the Namibian nurse workforce.

Another important element of the Namibian health system is the organization of health facilities in Namibia. Hospitals tend to be located centrally, whereas clinics are located in remote areas and health centers are in geographic areas that are neither central nor remote. HIV services are provided at all facilities. Both physicians and nurses deliver care, but physicians are located only in hospitals, and nurses are generally key staff members for health centers and clinics and are often the only staff in these facilities. District hospitals are usually staffed with a ratio of one doctor to seven nurses, while intermediate hospitals are staffed with one doctor to five nurses. Health centers have ratios of one registered nurse to two enrolled nurses, but clinics have one registered nurse to one enrolled nurse ratios (Titus et al., 2015). These numbers correspond with the number of patients seen at each type of facility, with the most patients being seen at intermediate hospitals and the least at clinics. However, these numbers also highlight the lack of physicians at health centers and clinics, emphasizing nurses' important role in delivering HIV services at these facilities. Clinics are often staffed with only one nurse (Titus et al., 2015). This organization of health facilities and staff highlight the importance of the nursing workforce in HIV services in Namibia, as nurses alone provide HIV services in remotely located health centers and clinics.

Interventions to Improve the Namibian HIV Services

IntraHealth International (hereafter referred to as IntraHealth), a not-for-profit, non-governmental organization (NGO) focused on global health, began working in Namibia in 2005 to address health workforce challenges, improve patients' access to HIV services, and help achieve the United Nation's 90-90-90 goal. In 2015, the United States Agency for International

Development (USAID) awarded IntraHealth a contract to implement the HIV Clinical Services Technical Assistance Project (UTAP). The purposes of UTAP were, first, to strengthen the public health system and NGOs to deliver high-quality, accessible services for HIV prevention, care, and treatment, and, second, to reduce HIV morbidity and the occurrence of new HIV cases (Intrahealth International, 2015). To achieve these project goals, IntraHealth focused on enhancing health workers' abilities to deliver high-quality HIV services and on building capacity among local NGOs and public-sector facilities to deliver high-quality integrated HIV services in Namibia (IntraHealth International, 2018).

In collaboration with the Ministry of Health and Social Services (MoHSS), IntraHealth assessed the staffing of key sectors of the Namibian public health workforce—nurses, physicians, pharmacists, and pharmacy assistants—to identify areas of greatest needs in the Namibian health workforce. IntraHealth conducted a survey tool designed by the WHO, the workload indicator of staffing needs (WISN), to assess the workload capacity of each sector. The results indicated that the supply of nurses was poorly distributed among public hospitals, health centers, and clinics (McQuide et al., 2013). To address this maldistribution and improve the quality of HIV services, IntraHealth, in partnership with the MoHSS, focused on improving staffing levels in Namibian facilities by hiring nurses out of retirement and hiring expatriate nurses (IntraHealth International, 2018).

IntraHealth and the MoHSS also developed and implemented an intervention to maximize the utility of the existing nurse workforce and to improve the delivery of HIV prevention, care, and treatment by training nurses in nurse-initiated management of anti-retroviral therapy (NIMART). Before the implementation of NIMART, patients who were beginning ART medications received their medications only from physicians. After physicians

issued prescriptions, nurses were able to manage medications, but they were not able to initiate treatments for patients. Therefore, patients needed to go to centralized hospital locations in order to be prescribed ART medications.

NIMART changed the way that HIV patients were managed. Specifically, nurses were trained both to initiate and to manage patients on ART medications, which allowed patients to receive HIV care and begin ART medications from nurses employed in health centers and clinics located in the more remote areas of Namibia (Intrahealth International, 2015). Prior to implementing this training, the Health Professional Council of Namibia changed the scope of practice for nurses to allow them to prescribe and manage HIV medications.

By training nurses through NIMART, Namibia safely shifted some of the workload for delivering HIV care from physicians to nurses. In partnership with the Namibian government, USAID, and other donors, IntraHealth implemented this project in 73 hospitals, health centers, and clinics throughout eight districts with the highest HIV burden in Northern Namibia (IntraHealth International, 2015; IntraHealth International, 2017). The training began in September 2015, and NIMART-trained nurses joined facilities over the next two years (Mdala et al., 2018). In subsequent reports, 86% of patients who received HIV care at these public health facilities had a suppressed viral load, a rate similar to that of patients who received their care at district hospitals (Mdala et al., 2018).

NIMART training required nurses to complete two days of didactic teaching and class learning demonstrations, followed by two days of clinic visits where nurses provided care to HIV-positive patients and started ART medications under the supervision of a physician. Nurses also had to pass a written test after their final day of training. Lastly, nurses completed 20 mentor-supervised visits with a physician or nurse mentor (Mdala et al., 2018). After this point,

nurses could prescribe and manage HIV medications autonomously. Both ENs and RNs participated in NIMART training.

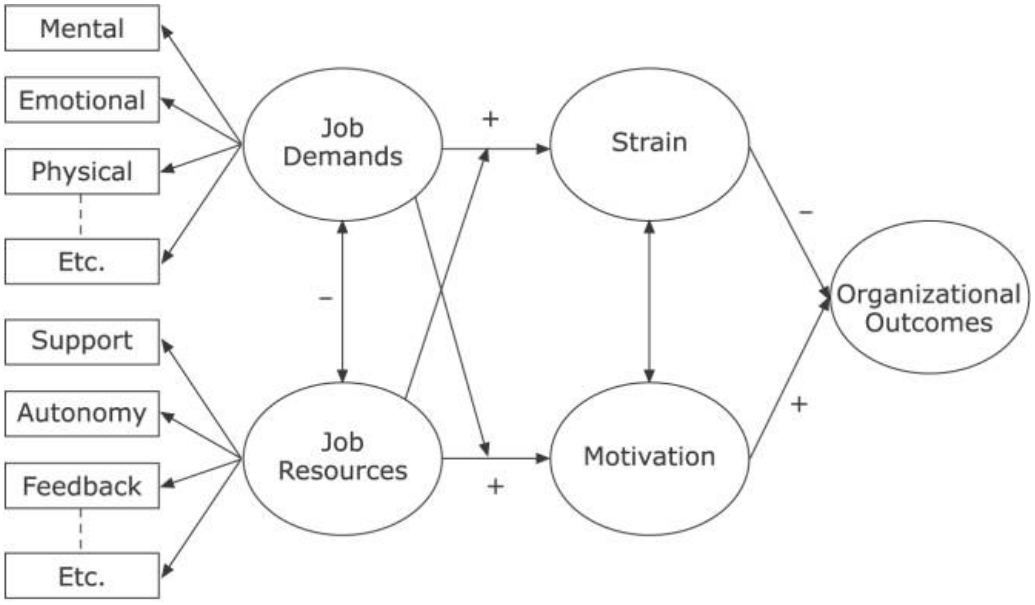
Given recent interventions to improve HIV services and HIV outcomes related to the nursing workforce in Namibia, it is especially important to understand the relationship between nurse staffing, nurse attitudes, and outcomes in Namibia, as nurses are a vital part in the fight against HIV in Namibia. Therefore, this dissertation will examine nurse staffing and nurse attitudes to understand how these factors impact HIV outcomes in Namibia.

Theoretical Approach

The theoretical approach on which this dissertation is based is the job demand-resource model (JD-R). The JD-R includes 5 constructs (job demands, job resources, strain, motivation, and organizational outcomes) to explain relationships among organizational job conditions, employee job attitudes, and organizational outcomes. The JD-R emerged from organizational psychology as a way to explore the work environment and how it affects employee well-being (Bakker & Demerouti, 2017). Figure 1.1 shows the proposed relationships among constructs of the JD-R (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001).

Figure 1.1

The job demands-resources model (Bakker & Demerouti, 2007)



Job demands are various job-related physical, psychological, social, and organizational factors that affect individuals' abilities to achieve work-related goals (Bakker & Demerouti, 2007). For example, when job demands are high, workers may experience negative effects, such as job strain, and the organization may ultimately experience negative outcomes. Examples of job demands include high workloads, intense time pressures, challenging physical environments, or emotional demands from shift work (Demerouti et al., 2001).

Job resources are job-related physical, psychological, social, and organizational factors that help individuals achieve work-related goals and, ultimately, help organizations achieve performance outcomes. Job resources are postulated to reduce job demands and enhance personal well-being. Together, high job resources and low job demands improve employees' work motivation and decrease work strain, and, in turn, these constructs improve organizational outcomes (Bakker & Demerouti, 2007). Some examples of job resources are rewards, job control, job security, and supervisor support (Demerouti et al., 2001). Taken together, job

demands and job resources essentially reflect the overall job conditions that are shaped by the organization and within which employees work (Bakker & Demerouti, 2017).

Strain is defined as job-related anxiety, exhaustion, or dissatisfaction that arises from an individual's job. High job demands are postulated to increase worker strain (Bakker & Demerouti, 2007). In JD-R research from 2014, the construct of strain was redefined and operationalized as *burnout*, a state of exhaustion and cynicism toward work (Bakker, Demerouti, & Sanz-Vergel, 2014).

Motivation reflects an employee's engagement, energy, and satisfaction arising from their work (Bakker & Demerouti, 2007). In recent JD-R development, motivation was redefined and operationalized as *worker engagement*, or a positive state of vigor, dedication, and absorption about one's job (Bakker et al., 2014). High job resources were postulated to foster worker engagement. Taken together, worker strain and motivation reflect individuals' job attitudes. Positive job attitudes are postulated to lead to higher job performance and to increase organizational outcomes (Bakker & Demerouti, 2017).

Organizational outcomes are conceptualized as an organization's financial or service goals (Bakker, Demerouti, & Verbeke, 2004). As worker engagement increases, organizational outcomes are also proposed to increase. However, as work strain or burnout increases, organizational outcomes are expected to decrease (Bakker & Demerouti, 2007). In a health care delivery organization, organizational outcomes may be related to patients because patients are the recipients of organizational services.

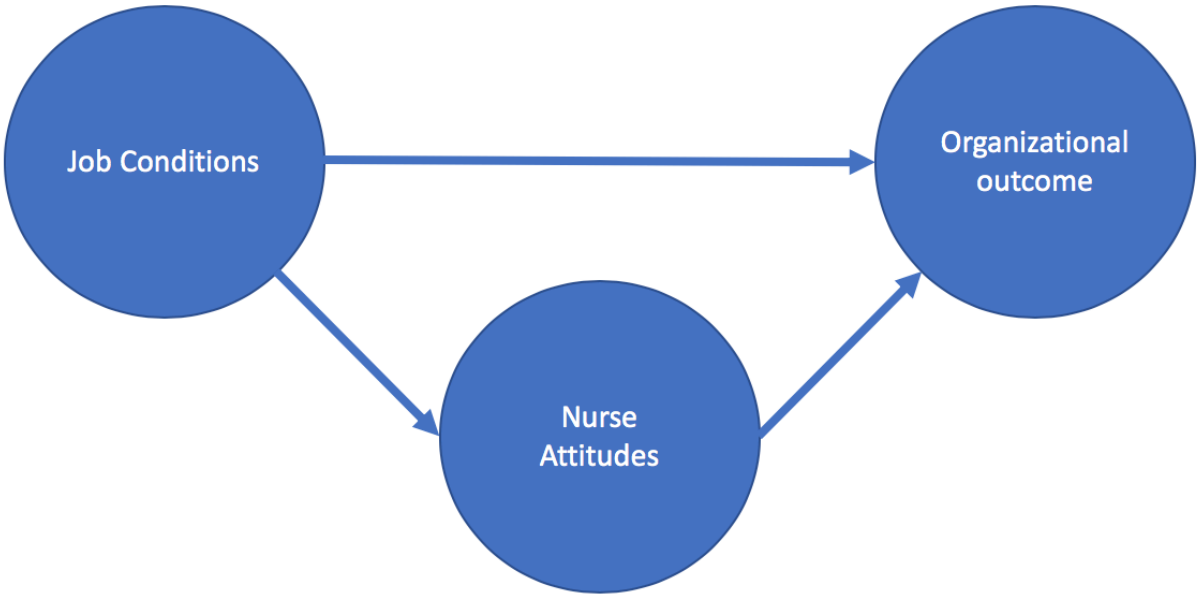
Bakker and Demerouti (2007) proposed three relationships among constructs of the JD-R. First, the authors postulated that there is a negative relationship between job demands and job resources; in other words, as job demands increase, job resources decrease, and vice versa.

Second, job demands moderate the relationship between job resources and motivation. That is, the relationship between job resources and worker engagement may be weakened (or strengthened) if job demands are high (or low). Third, job resources moderate the relationship between job demands and work strain or burnout; that is, the relationship between job demands and work strain/burnout is weakened (or strengthened) if job resources are high (or low).

The conceptual approach used in this study was derived from the JD-R, and it focuses on select areas of the model. This dissertation examined the relationships between, first, job conditions (i.e., job demands and resources) and organizational outcomes (patient HIV outcomes), second, job conditions and job attitudes (i.e., burnout and engagement), and, last, the relationship between job attitudes and organizational outcomes. Figure 1.2 illustrates the constructs examined in this dissertation.

Figure 1.2

Constructs of Interest



The JD-R has been used to study different types of workers, including nurses, across different job sectors. The original model developed by Demerouti et al., in 2001, was used to examine the job demands and resources of 374 employees in 21 different jobs from different organizations in northern Germany, including teachers, nurses, industry workers, and more. The authors reported that there was a positive relationship between job demands and work strain/burnout (operationalized as employee exhaustion) and a positive relationship between job resources and motivation (operationalized as job engagement) (Demerouti et al., 2001). Several studies also have reported a positive relationship between high worker motivation and improved business unit performance, customer satisfaction, employee loyalty, profitability, productivity, improved safety, and employee retention (Bakker & Demerouti, 2007; Bakker et al., 2004; Harter, Schmidt, & Hayes, 2002). The JD-R has also been used to examine nurse motivation, defined as nurse engagement, which has been linked to increased patient safety and patient satisfaction (Argentero, Dell'Olivo, & Santa Ferretti, 2008; Halbesleben, Wakefield, Wakefield, & Cooper, 2008). Therefore, this study used the JD-R to examine the nurse staffing and nurse attitudes on HIV-related outcomes in public hospitals, health centers, and clinics in Namibia.

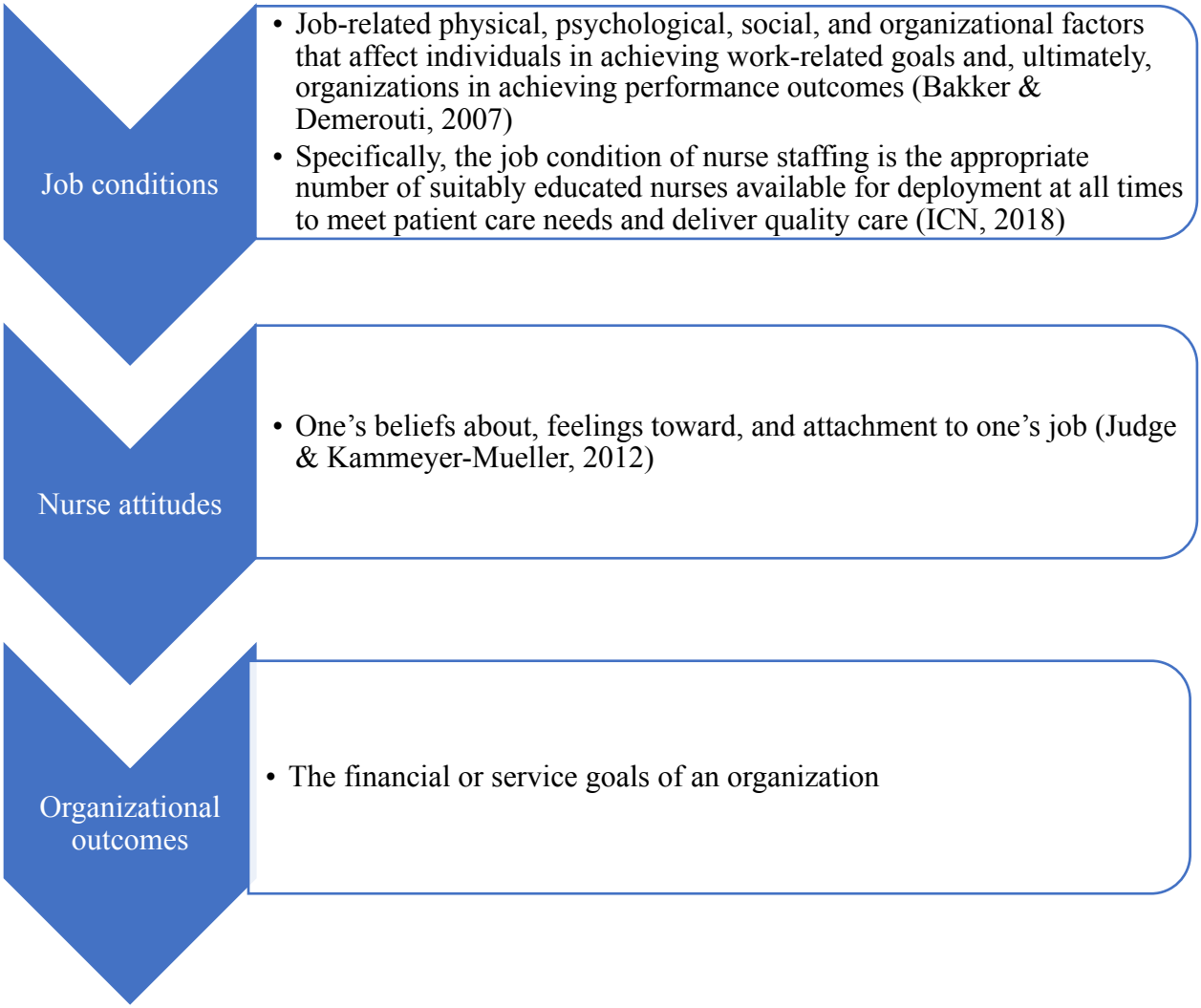
This dissertation examined a variety of job conditions, many of which relate to the nurses' working environment. However, this dissertation will focus most heavily on the job condition of nurse staffing. Nurse staffing is hypothesized to be positively (i.e., a job resource) or negatively (i.e., a job demand) associated with organizational outcomes. Nurse staffing is defined using the definition provided by the International Council of Nurses (ICN), as an appropriate number of nurses with an appropriate educational mix available for deployment at all times to meet patient care needs and deliver quality care (ICN, 2018a).

For this study nurses' job attitudes were defined as nurses' beliefs about, feelings toward, and attachment to their jobs (Judge & Kammeyer-Mueller, 2012). Based on the JD-R, nurse-staffing levels that are adequate and represent a job resource are expected to bring about more positive job attitudes and, in turn, to improve organizational outcomes.

The organizational outcomes of interest in this dissertation are VLD and VLS because they are key indicators of successful HIV treatment. Based on the JD-R, I anticipated that nurse-staffing levels were positively related to nurse attitudes, and, in turn, to viral load documentation and viral load suppression in patients. Figure 1.3 outlines the variables of interest for this dissertation.

Figure 1.3

Definitions of Nurse Staffing, Nurse Attitude, and Organizational Outcomes



Study Purpose, Specific Aims, and Methods

The purpose of this dissertation is to examine nurse job conditions, nurse attitudes, and organizational outcomes in HIV services in Namibia. Using multiple methods, this dissertation combined both quantitative and qualitative approaches to help gain a richer understanding of the role of nurses in achieving high-quality patient outcomes (Creswell, Klassen, Plano Clark, & Smith, 2011).Two methods were used in this dissertation: first, a secondary analysis of existing data gathered in 73 public health facilities in Namibia that participated in the IntraHealth project

to examine the relationship between nurse staffing and, second, HIV-patient outcomes and qualitative interviews of staff from 14 of these facilities to examine nurses' attitudes about their jobs. Specifically, this dissertation addresses the following questions:

1. What are the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings?
2. What is the relationship between nurse staffing and organizational outcomes (specifically VLD and VLS) in a sample of Namibian outpatient health facilities?
3. What are the attitudes of Namibian nurses who work in outpatient settings toward their jobs?
    a. What factors contribute to nurses' attitudes about their jobs?
    b. How do nurses' attitudes about their job contribute to organizational outcomes (specifically viral load documentation and viral load suppression)?

This dissertation is formatted as three publishable papers for dissemination. Each paper addresses the questions outlined above. Table 1.1 provides an overview of the following three papers and addresses their aims. An overview of each paper that constitutes this dissertation is further discussed in the following sections.

Table 1.1

Overview of Research Questions and Methods for Addressing

Question	Paper	Areas of Framework addressed	Methods
Question 1	Paper 1 (Chapter 2)	Nurse staffing, nurse attitudes, organizational outcomes	Scoping review
Question 1,2	Paper 2 (Chapter 3)	Nurse staffing, organizational outcomes	Quantitative secondary analysis using existing nurse staffing and outcomes data from IntraHealth and MoHSS
Question 1,3	Paper 3 (Chapter 4)	Nurse attitudes	Qualitative directed content analysis of semi-structured interviews with Namibian nurses

Paper 1 (Chapter 2): Nurse Staffing, Nurse Attitudes, and Organizational Outcomes in Outpatient settings: A Scoping Review

This paper reviews and synthesizes the available literature on nurse staffing, nurse attitudes, and their relationships with organizational outcomes in outpatient settings. A scoping review was chosen for this analysis to provide a broad and comprehensive review of the literature and to provide a foundation for subsequent chapters. This scoping review follows PRISMA guidelines for scoping reviews (Tricco et al., 2018).

A preliminary search of the literature was conducted, and it was determined that sufficient literature was available for the review. An expanded literature search was conducted to explore the relationships among nurse staffing, nurses' job attitudes, and organizational outcomes in outpatient settings. The search was conducted using the following search engines: Ebsco*host* Global Health, PubMed, and CINHAL. If studies represented either an empirical

analysis published in a refereed journal or grey literature that examines nurse staffing, nurse attitudes, and/or organizational outcomes, they were included in this review. Two reviewers completed the title, abstract, and full-text screen reviews for all identified studies to determine if they met these criteria. Data were extracted on specific aspects of each study: purpose of study, country of origin, study design, theory/framework, setting and sample, staffing measures, nurse attitude measures, outcome measures, and study findings. Findings were used to understand the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings. The findings of this review provided support for other chapters in this dissertation by uncovering how nurse staffing affects organizational outcomes in outpatient settings, how nurse staffing affects nurses' attitudes, and how nurses' job attitudes affect their ability to provide care in health care organizations.

Target Journal

The journal *Health Policy and Planning* is the target journal for this paper. This journal focuses on health policy and systems research, has an international focus, and has published prior workforce studies and papers on similar topics. This paper is particularly well-suited to this journal because the paper is consistent with the journal's focus. This paper contributes an analysis of published literature in the policy-relevant areas of nurse staffing, nurse attitudes, and outcomes.

Paper 2 (Chapter 3): The Relationship Between Nurse Staffing and HIV Outcomes in Namibian Outpatient Settings

This paper presents a secondary analysis of data by examining the relationship between nurse staffing and organizational outcomes (VLD and VLS) for HIV patients treated at public health facilities in Namibia. This was an analysis of data from 73 Namibian health facilities that

participated in the IntraHealth UTAP project. The independent variable, nurse staffing, was operationalized using the WISN ratio, gathered via the WISN tool, to estimate a staffing ratio of the number of actual to needed nurses (WHO, 2010). The WISN tool is widely used in many low- and middle-income countries to determine how to make staffing decisions at a unit, regional, or national level for a variety of different cadres of health workers (Doosty, Maleki, & Yarmohammadian, 2019). Despite the widespread use of the WISN to make clinical and organizational decisions, there are no reports of its use in research. You might also be able to simplify by writing: "The dependent variables, VLD and VLS of individuals living with HIV who were cared for in the 73 Namibian public health facilities, were measured using HIV indicators recommended in the President's Emergency Plan for AIDS Relief (PEPFAR) (PEPFAR, 2017). These measures were originally collected by IntraHealth for evaluation purposes. This paper modeled the impact of nurse staffing and other control variables on patient's VLD and VLS at a facility level to determine the relationship between nurse staffing and organizational outcomes.

Target Journal

The target journal for this paper is the open access journal *Human Resources for Health*. This journal is recommended because it focuses on the global study, planning, and governance of human resources for health to ensure patient care delivery. The findings of this paper will inform decision-makers and health-workforce planners as they develop strategies to staff facilities to achieve desired patient outcomes. Therefore, this journal seems particularly well-suited for reaching these key stakeholders. Before submitting this paper for publication, I will submit a request to the Namibian MoHSS for its approval. In addition, a leader from the Ministry will be invited to serve as co-author on the manuscript.

Chapter 4 (Paper 3): Namibian Nurses' Attitudes About Their Jobs

This chapter outlines the qualitative portion of this dissertation by exploring both the job attitudes of Namibian nurses working in outpatient settings about their job and the factors that shape their job attitudes. To achieve this purpose, in-person, qualitative interviews were conducted with 18 nurses working in outpatient 14 public health facilities in Namibia. An interview guide was developed based on past research on nurses' attitudes about their jobs, and the guide was reviewed by an expert panel. Analysis of interview data was conducted using directed content analysis (Hsieh & Shannon, 2005). Transcripts were coded using Atlas.ti to formulate categories that represent the data. Using the JD-R, I analyzed codes and categories to determine the extent to which they reflected the constructs of job demands, job resources, worker strain, worker motivation, and organizational outcomes. This approach supported the development of a rich depiction of how Namibian nurses describe their attitudes toward their jobs and related factors.

Target Journal

The target journal for this paper is the *International Journal of Nursing Studies*. This journal publishs research on health care delivery, organization, workforce, policy, and management. Nurse attitudes and their relationships with organizational outcomes are key issues in health care delivery and health workforce research. The results of this paper can inform the development of workplace policies and strategies to address nurse attitudes and can improve patient care delivery. Just as with the results of chapter 3, before submitting this paper for publication, I will submit a request to the Namibian MoHSS for approval. A key leader from the Ministry will be invited to serve as a co-author on the manuscript.

Chapter 5

Chapter 5 provides a discussion of dissertation findings presented in previous chapters, including major study findings, the interpretation of meaning from study findings, and the significance of these findings for the study aims. In addition, this chapter discusses the limitations of this dissertation; the ways these findings inform future research, administration, education, and policymaking; and recommendations for moving this research forward in future projects.

Chapter Summary

An overview of the dissertation was presented in this chapter, including the background, theoretical approach, and individual papers that comprise this dissertation. Guided by the JD-R, this dissertation explored the relationships among nurse staffing, nurses' job attitudes, and organizational outcomes as they pertain to the provision of HIV services in Namibian outpatient health facilities. Subsequent chapters explore specific elements of the dissertation, and they include the analyses that were conducted.

CHAPTER 2: NURSE STAFFING, NURSE ATTITUDES, AND ORGANIZATIONAL OUTCOMES IN OUTPATIENT SETTINGS: A SCOPING REVIEW

Nurses are an integral part of the health workforce and key to achieving global universal health coverage (Crisp et al., 2018). Yet, nurses often work in poor conditions and lack adequate organizational supports, both of which prevent them from delivering high-quality care (Crisp et al., 2018). To overcome these challenges, nurse staffing must be adequate (Ball et al., 2018) and nurses must be engaged in their jobs and have a positive attitude about their jobs (Asiret et al., 2017; Van Bogaert et al., 2017).

The relationships among nurse staffing, nurses' job attitudes, and a variety of different organizational outcomes have been studied in detail. Although several published literature reviews on the topic have focused almost exclusively on inpatient care, nurse staffing in outpatient settings has been largely overlooked. Outpatient settings, or care delivered to patients outside of an institutional inpatient bed (WHO, 2009), is a key part of the health care continuum, as it is aimed at preventing disease and promoting wellness. However, a review of the literature on the relationship between nurse staffing or nurses' job attitudes and patient outcomes in outpatient settings has not been reported.

Therefore, the purpose of this paper is to present a scoping review that evaluates the relationships among nurse staffing, nurse attitudes, and organizational outcomes in the outpatient setting. This scoping review will inform the interpretation of findings from subsequent chapters in this dissertation, which focus on nurse staffing and nurse attitudes in outpatient HIV services in Namibia. Moreover, a better understanding of the literature on the relationships among nurse

staffing, nurse attitudes, and organizational outcomes in outpatient settings will help inform policies related to global outpatient nursing workforces and will highlight gaps in research specific to the nurse staffing and nurse attitudes.

Background Literature

Nurse staffing is defined as having an appropriate number of nurses available, at appropriate times, with an appropriate educational mix, and with appropriate competencies to meet patient care needs and deliver quality nursing care (ICN, 2018a). This background literature section first reviews various measures of nurse staffing and then briefly discusses previous research on nurse staffing and nurse attitudes.

Measures of Nurse Staffing

There are several ways that nurse staffing has been measured in prior research. A review of 17 nurse staffing research papers revealed 6 primary nurse staffing measures used in prior research: patient to nurse ratios, the number of full time equivalent nurses available, the number of nursing hours per patient day, nursing skill mix (e.g., the proportion of RNs relative to other types of nursing staff), nurses' perceptions of staffing adequacy, and nurses' self-reports of the numbers of assigned patients cared for during a shift or some defined period of time (Min & Scott, 2016). Another commonly used nurse staffing measure is the WISN, a tool that the WHO recommends that countries use to make staffing decisions (WHO, 2010); however, a scoping review of the uses of the WISN reveals that this tool has not been used as a measure in research (Doosty et al., 2019). No review was found that reported a scoping literature review on measures of nurse staffing in outpatient settings. This review will examine measures of nurse staffing by focusing on staffing measures in relationship among nurse staffing, nurse attitudes, and organizational outcomes.

Nurse Staffing

Prior research examining the relationships between nurse staffing and patient outcomes in inpatient care reported an inverse relationship between nurse staffing and the following patient outcomes: mortality (Mark, Harless, McCue, & Xu, 2004), ulcers (He, Staggs, Bergquist-Beringer, & Dunton, 2016), cases of hospital acquired pneumonia (Kane, Shamliyan, Mueller, Duval, & Wilt, 2007), rates of respiratory failures (Kane et al., 2007), cardiac arrests (Kane et al., 2007), and prognostic staging for HIV patients (Aiken, Sloane, Lake, Sochalski, & Weber, 1999). These findings indicate a positive relationship between nurse staffing and organizational outcomes for inpatient care, but no reviews report a synthesis of the literature on nurse staffing research in outpatient settings.

Nurse Attitudes

Nurses' attitudes, or nurses' beliefs about, feelings toward, and attachment to their jobs (Judge & Kammeyer-Mueller, 2012) are also an important consideration in nurse staffing research, as they can contribute to a nurses' ability to do their jobs well. Like nurse staffing research, nurse attitudes have been conceptualized and operationalized in different ways, including nurses' job satisfaction (Chu & Hsu, 2011), organizational commitment (Chu & Hsu, 2011), job engagement (Freeney & Tiernan, 2009), work motivation (Toode et al., 2011), and burnout (Van Bogaert et al., 2017). In inpatient nursing research, burnout and engagement together explain 53% of the variance in quality of care (Van Bogaert et al., 2017). Burnout is also associated with increased patient falls, medications errors, and infections (Nantsupawat et al., 2016). When examined in inpatient settings, burnout has been reported to mediate fully the relationship between work characteristics and turnover intention of nurses, whereas engagement mediates partially the relationship between social support and nurses' turnover intention (Gabel

Shemueli, Dolan, Suárez Ceretti, & Nuñez del Prado, 2016). Although this work has not been replicated yet in outpatient settings, it nonetheless highlights the importance of nurses' job attitudes toward organizational outcomes, which most likely impact nurse staffing in outpatient settings.

Summary of Background Literature

Past nurse staffing research has used a variety of measures to study nurse staffing to better explain nurses' job intentions related to inpatient settings, but this research has ignored outpatient settings. The gap in understanding between nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings is increasingly relevant to address because it helps identify differences in both nurse staffing and nurse attitudes and differences between outpatient and inpatient settings.

Theoretical Approach

In this scoping review, nurse staffing and nurse attitudes are viewed through the lens of the JD-R. This model hypothesizes that the job conditions of demands (e.g., workload) and resources (e.g., adequate nurse staffing) affect worker attitudes, which, in turn, affect organizational outcomes (Bakker & Demerouti, 2017; Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Demerouti et al., 2001).

Job demands are conceptualized as various physical, psychological, social, and organizational factors that affect an individual's ability to achieve work-related goals (Bakker & Demerouti, 2007). When job demands are high, workers may experience negative effects, such as job strain frustration or burnout, and the organization may ultimately experience negative outcomes. Examples of job demands include high workloads, intense time pressures, challenging physical environments, or emotional demands from shift work (Demerouti et al., 2001). *Job*

resources are physical, psychological, social, and organizational factors that help individuals achieve work-related goals and, ultimately, help organizations achieve performance goals. This scoping review will report the findings of studies demonstrating nurse staffing in outpatient settings in one of two ways, either as a demand (e.g., if staffing is reported to be inadequate or insufficient) or as a resource (e.g., if staffing is reported to be adequate or sufficient).

The JD-R conceptualizes job attitudes as *worker burnout* (Demerouti et al., 2001), or the state of exhaustion and cynicism toward work (Bakker et al., 2014), and as *worker engagement,* or the positive affective state of vigor, dedication, and absorption in one's job and work (Bakker et al., 2014). This scoping review will report the findings of studies that examine nurses' job attitudes to include burnout, engagement, and other measures of nurse attitudes in outpatient settings that both appear in the literature and conform with the definition of nurses' beliefs about, feelings toward, and attachment to their jobs (such as job satisfaction, motivation at work, or frustration at work) (Judge & Kammeyer-Mueller, 2012).

The JD-R is an especially relevant lens with which to assess and evaluate the literature for this review, as it provides context for understanding the relationships between the job conditions of demand and the resources (i.e., nurse staffing) that affect nurses' attitudes toward their jobs and, ultimately, organizational outcomes in outpatient settings. Organizational outcomes for this review will be considered to be any performance-based outcome of nurses' jobs, including patient outcomes, such as disease management indicators and patient satisfaction, as well as financial and operational outcomes, such as turnover and costs. This scoping review will follow the JD-R as it explores the relationships between nurse staffing, nurse attitudes, and organizational outcomes.

Methods

My approach to this scoping review was guided by the PRISMA guidelines for scoping reviews (Tricco et al., 2018). Scoping reviews are a type of literature review that uses methodological standardization to map broad topics, with the specific aim of mapping the literatures' volume, nature, and characteristics (Pham et al., 2014). This is an appropriate methodology for topics that have not yet been extensively reviewed, such as nurse staffing and nurse attitudes in outpatient settings (Pham et al., 2014). In keeping with the work of Arskey and O'Malley (2005), Levac et al., (2010), and the PRISMA guidelines (Tricco et al., 2018), this scoping review involved the following five steps: identifying the research question; searching for and identifying relevant studies; selecting studies; charting the data; and collating, summarizing and reporting results. Each of these steps are addressed below (Tricco et al., 2018).

Identifying the Research Question

This study sought to answer the following research question: What are the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings? This question was identified based on the JD-R because it highlights the relationship between job conditions, which include nurse staffing, nurse attitudes, and organizational outcomes.

Identifying Relevant Studies

The literature search for this scoping review focused on nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings, and it also included synonyms for these terms. The full search strategy was developed in collaboration with a health sciences librarian to ensure a thorough search approach. Because they are key health, nursing, and global health databases, the following databases were searched while conducting this literature review: PubMed, Ebsco*host* CINAHL, and Ebsco*host* Global Health. The complete search string for

PubMed, Ebsco*host* CINAHL, and Ebsco*host* Global Health is provided in Appendix A. Reference lists of included studies were searched to find additional relevant articles. No publication date restrictions were included on the search to ensure a comprehensive inclusion of relevant literature.

This scoping review included both qualitative and quantitative studies published in English. The inclusion criteria for this scoping review focused on prior research conducted on nurse staffing, nurse attitudes, and organizational outcomes research. Studies were specifically excluded if they did not examine nurses or if they do not include either nurse staffing or nurse attitudes as a variable of interest. Staffing studies were included in the review if the purposes of studies were consistent with the purpose of this study and if nurse staffing was defined in a way that is consistent with the ICN's definition of nurse staffing (ICN, 2018a). In keeping with the purpose of the review, only studies of nurse staffing conducted in outpatient settings were included. All types of nursing personnel were considered in this examination of nurse staff, including nurse practitioners (NPs), registered nurses (RNs), enrolled nurses (ENs), licensed practical nurses (LPNs), and nursing assistants (NAs); definitions for each term are provided in Appendix C.

Nurse attitudes was defined as nurses' beliefs about, feelings toward, and attachment to one's job (Judge & Kammeyer-Mueller, 2012). This definition was sufficiently broad to include attitudes such as job burnout, frustration, stress, satisfaction, engagement, and motivation.

Organizational outcomes were defined as any financial or service goal of an outpatient settings organization where nurses work (Bakker et al., 2004). This review included common organizational outcomes of health care settings, including patient outcomes, organizational performance outcomes, and cost-effectiveness of care.

Selecting Studies

All articles identified during the search were entered into the software Covidence to screen articles with two reviewers. In this step, final decisions about the inclusion or exclusion of results from the above search were made to obtain a final sample. This step involved two stages, each undertaken to determine the fit between the purpose of this review and the studies obtained from the literature search. The title and abstract of each article were reviewed first; then, for each remaining article, a full text article screen was undertaken. At both stages, two reviewers read all articles to determine if the article should be included in the review. Two reviewers were used to decrease potential bias in literature selection and review (Tricco et al., 2018). A PRISMA flow diagram (Figure 2.1) was created to describe the search results, including the articles excluded at each step in the process and the final sample of articles (Tricco et al., 2018). Studies were categorized into the three areas of interest to assess the potential magnitude and scope of available research (Grant & Booth, 2009).

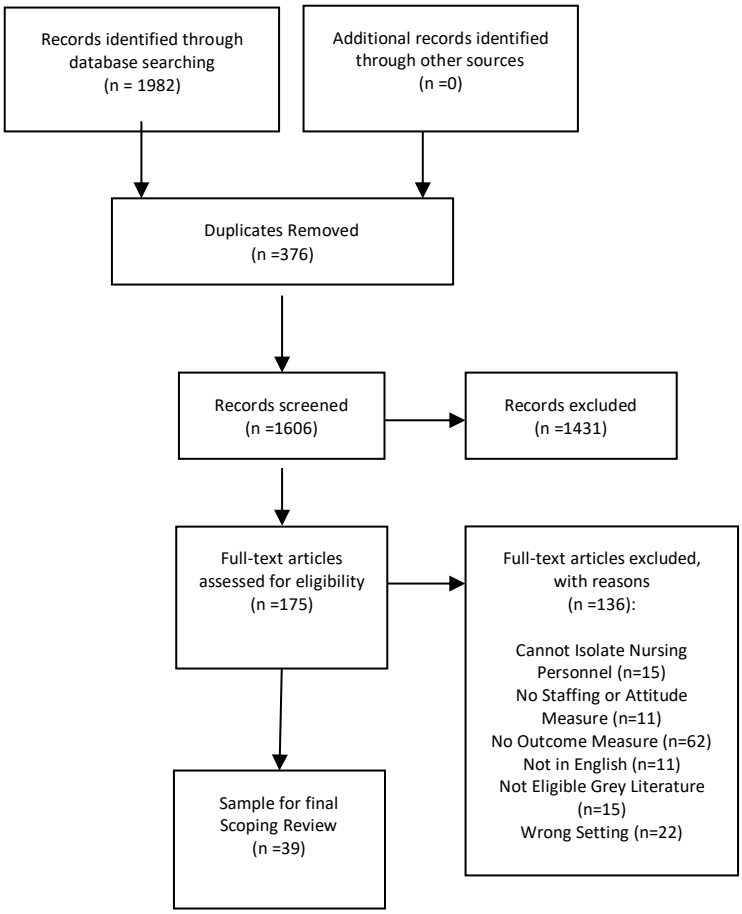
The initial search yielded 1,982 articles, 376 of which were duplicates, leaving 1,606 for possible review. No articles were included from any sources outside the search. After title and abstract screening, 1,431 articles were removed because they did not meet inclusion and exclusion criteria; at this step, 175 articles remained for full text screening. The two reviewers determined that 136 of the 175 articles did not meet inclusions/exclusion criteria for the following reasons: the articles did not isolate nursing personnel as the subject of interest (i.e., these articles did not separate other cadres of health workers from nurses), staffing or attitude were not measured, outcomes were not measured (i.e., the article studied the described nurse staffing or nurse attitudes without an outcome), the article was not

a peer-reviewed scholarly paper, or the article was not set in an outpatient settings setting. This process yielded a final sample of 39 studies.

In keeping with scoping review guidelines, no articles were eliminated because of the quality of studies included (Tricco et al., 2016). However, the quality of studies was assessed as part of the extraction of key elements of the study, including design and sample size (Pluye, Gagnon, Griffiths, & Johnson-Lafleur, 2009).

Figure 2.1

Scoping Review PRISMA Diagram



Charting the Data

During the review, two documents were prepared to record the data gathered: a data extraction template for the review of each study and a data extraction matrix that compiled important information across all the studies reviewed. First, each study was extracted into a data extraction template, as shown in Appendix D. The extraction template included specific aspects of the JD-R relevant to this study, including the job resource or demand of nurse staffing, nurse attitudes, and organizational outcomes identified in the literature. To address quality of the

included studies, information on the purpose of study, study design, setting, sample, and measures were extracted. The extraction of data from individual studies allowed for a review of each study by key area of the JDR. The extraction templates focused on the research question of this scoping review and on the information needed to assess the quality of each article reviewed.

Second, information from the data extraction template for each study was compiled and transferred to a data extraction matrix, which allowed for cross-study comparisons of articles, as shown in Appendix E. The matrix was developed to focus on key variables of interest: nurse staffing, nurse attitudes, and organizational outcomes. This matrix facilitated the categorization of important research methods that reflect study findings and quality, including the purpose of study, study design, and sample size and characteristics.

Collating, Summarizing, and Reporting Results

This final step was divided into 3 sub-steps that were necessary to complete the review: reporting the initial results of the review, evaluating the results relative to the research question, and presenting the greater meaning of the results (Levac, Colquhoun, & O'Brien, 2010). The first step, reporting the initial results, was completed by collating and presenting demographic data on all studies through a numerical summary. This sub-step documented study design theory, setting, sample, and the countries of origin for each study (Levac et al., 2010). This sub-step also helped identify the specific measures of nurse staffing, nurse attitudes, and organizational outcomes for each study, and to identify the specific research methods that were used.

Next, results were evaluated relative to the research question. This step addressed how each article contributed to my understanding on the relationships among nurse staffing, nurse attitudes, and outcomes in outpatient settings from the literature.

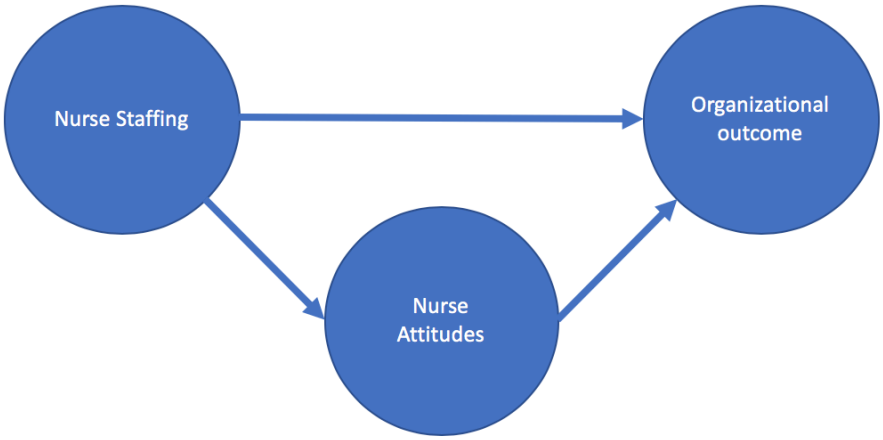
Lastly, future research, practice, and policy implications were evaluated for all studies (Levac et al., 2010). This step involved connecting the results of this review that focused on outpatient settings to previous published research.

Results

To present the results of the review, first, a general overview of key characteristics of all studies included will be presented. Next, findings will be presented using key areas of the JD-R related to outpatient settings to include 1) the relationship between nurse staffing and outcomes, 2) the relationship between nurse staffing and nurse attitudes, and 3) the relationship between nurse attitudes and outcomes. Figure 2.2 describes the organization of the results section, and this results section explores each of the relationships depicted. Addressing each of these three areas informed the discussion of proposed relationships of the JD-R that emerged from the review.

Figure 2.2

Proposed Relationships among Nurse Staffing, Nurse Attitudes and Organizational Outcomes



Overview of Key Findings

An overview of included articles can be found in table 2.1. The origin for each of the 39 studies included the following: 24 studies conducted in the United States, three studies conducted in the United Kingdom and three in Australia; two studies conducted in Canada and two in South Africa, four conducted in other countries (i.e., in Indonesia, Kenya, Netherlands and Spain), and one study conducted in several countries. Only three studies cited theories that were used to guide the work. These theories were organizational theory, self-determination theory, and Donabedian's structure-process-outcome framework. The sample of interest in most studies was RNs (n=30), followed by NPs (n=10), LPNs (n=5), practice nurse (n=3), nurse managers (n=1), and district (i.e., community) nurses (n=1).

Studies were primarily quantitative designs (n=30), followed by qualitative designs (n=7) and mixed methods (n=2). In some studies, the unit of analysis was the individual (patients,

nurses, and other health care providers), and in others the unit of analysis was the health care facility. For the quantitative studies, sample sizes ranged from 63 to 88,682 individuals and from 53 to 2,518 health care facilities. For the qualitative studies, sample sizes ranged from 8 to 101 subjects. For the quantitative studies, types of designs included cross-sectional survey design (n=17), cross-sectional observation design (n=6), case studies (n=2), quasi-experimental (n=2), simulation model (n=2), and quasi-experimental study (n=1). The qualitative studies were either qualitative descriptive (n=6) or qualitative comparative (n=1) designs. Lastly, there were two mixed methods studies (n=2).

Of the 39 articles, 33 focused on the relationship between outpatient nurse staffing and outcomes. Seven articles focused on the relationship between outpatient nurse staffing and nurse attitudes, and six articles focused on the relationship between nurse attitudes and organizational outcomes. Results for each of these areas specific to outpatient settings will be described in the following sections.

Table 2.1

Included Articles' Purpose, Theories, Country of Origins, Designs, Settings/Sample, and Measures

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
1	Aita et al., 2001	The aim was to describe patient care staff patterns and roles in community-based family practices	Not Cited	USA	Qualitative comparative	18 community-based family practices	RN, LPN	Staffing	FTEs
2	Ammi et al., 2017	Examine the association between different dimensions of nurses' activity and patients' experience with primary care	Not Cited	Canada	Cross-sectional survey	7,061 patients in primary care facilities across 10 provinces	RN, NP	Staffing	FTEs
3	Barber et al., 2007	To describe the changes in the number of physicians, nurses, and midwives per region and their effects on prenatal, child, and adult care	Not Cited	Indonesia	Cross-sectional survey	7,000 households in half of the 26 provinces and 992 public facilities	RN	Staffing	Nurse staffing in public facilities
4	Basu et al., 2015a	To create a simulation model to understand how practice utilization, revenues, and expenses may change in the context of workforce and financing changes	Not Cited	USA	Simulation model	2,518 primary care practices	NP	Staffing	Types of health workers staffed
5	Basu et al., 2015b	To estimate financial implications of chronic care management payment for primary care practices.	Not Cited	USA	Simulation model	31,229 patients from the national ambulatory medical care survey; 2500 practices across the country	RN	Staffing	Types of health workers staffed
6	Chuang et al., 2017	To examine barriers in providing primary care adaptations to better understand women veterans needs	Not Cited	USA	Qualitative descriptive	73 primary care providers and staff	RN	Staffing, attitude	Perceived staffing adequacy

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
7	Celentano, 1978	The aim was to compare Health Associates and NPs in their job satisfaction, workload, and various outcomes at work	Not Cited	USA	Cross-sectional survey	143 recent NP graduates	NP	Attitude	N/A
8	Delobelle et al., 2011	Aims to explain the relationship between demographic variables, job satisfaction, and turnover intent among primary care nurses	Not Cited	South Africa	Cross-sectional survey	175 nurses in 20 fixed and 6 mobile PC clinics	RN	Attitude	N/A
9	Dunbar et al., 2019	The aim is to identify how remote-area nurse staffing issues are perceived by clinic managers, nurses, and community members.	Not Cited	Australia	Qualitative descriptive	5 Managers, 29 Remote Area Nurses, 12 Aboriginal staff	RN	Staffing	Perceived staffing adequacy
10	Edwards et al., 2018	To understand which delegation of tasks occurs in teams and the factors associated with greater delegation and delegation's association with burnout	Not Cited	USA	Cross-sectional survey	777 VA primary care providers-nurse dyads	RN	Staffing, attitude	Perceived staffing adequacy
11	Friese & Himes-Ferris, 2013	Investigate job satisfaction and intent to stay for ambulatory oncology nurses (RNs & LPNs)	Donabedian Structure Process Outcomes Framework	USA	Cross-sectional survey	402 oncology nurses employed in the ambulatory setting	RN	Staffing, attitude	Perceived staffing adequacy
12	Friese et al., 2012	To identify the relationship between the organizational structures and processes of care in ambulatory oncology settings associated with increased risk of unintentional chemotherapy	Not Cited	USA	Cross-sectional survey	242 oncology nurses working outside the hospital inpatient units	RN	Staffing	Perceived staffing adequacy

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
13	Friese et al., 2016	To identify factors associated with job satisfaction and turnover through measures that reflect the ambulatory setting for nurses and NPs working in a national cancer institute	Not Cited	USA	Cross-sectional survey	319 nurses and NPs in an ambulatory setting of a national cancer institute	RN	Staffing, attitude	Perceived staffing adequacy
14	Gardner & Walton, 2011	To explore nurse satisfaction and dissatisfaction with the work environment in outpatient hemodialysis facilities	Not Cited	USA	Qualitative descriptive and cross-sectional survey	101 nurse participants from 35 focus groups in outpatient hemodialysis units	RN	Staffing, attitude	Perceived staffing adequacy
15	Graveley & Littlefield, 1992	Compare cost effectiveness analysis of three low-risk prenatal clinic staffing models: physician based, mixed staffing (physician, NP, RN, and NA), and nurse based	Not Cited	USA	Cross-sectional survey	156 subjects, all women who attended the clinics	NP	Staffing	Types of health workers staffed
16	Griffiths et al., 2011	To determine relationships between QOC and nurse staffing in general practice and determine if that relationship is enhanced by other organizational factors	Not Cited	United Kingdom	Cross-sectional survey	8,409 general practices	RN, Practice Nurse	Staffing	FTEs
17	Griffiths et al., 2010	The aim of this study was to examine whether practice nurse staffing level is similarly associated with non-elective hospital admissions in three clinical areas: asthma, chronic obstructive pulmonary disease (COPD), and diabetes.	Not Cited	United Kingdom	Cross-sectional survey	7,456 primary care practices	Practice Nurse	Staffing	FTEs
18	Gruber et al., 2008	To understand how to safely increase the number of chemotherapy patients seen in a clinic in a day	Not Cited	USA	Pre/post-test intervention (QI project)	967 patients at an outpatient chemotherapy unit	RN	Staffing	Nurse vacancies
19	Huang et al., 2017	To develop a staffing model that can safely see more	Not Cited	USA	Pre/post-test intervention	19 chair community	RN	Staffing	Patient-to-nurse ratios

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
		patients in an outpatient chemotherapy clinic				chemotherapy infusion centers			
20	Ireland et al., 2004	The purpose of this study was to determine which aspects of care staff RNs were responsible for in ambulatory settings	Not Cited	USA & Canada	Cross-sectional survey	3705 ambulatory oncology nursing	RN	Staffing	Nurse vacancies
21	Jackson et al., 2011	Examine potential associations between inclusion of mid-level providers in United States Veterans Affairs (VA) primary care programs and diabetes control.	Not Cited	USA	Cross-sectional observational	88,682 patients at 198 clinics in the VA primary care systems	NP	Staffing	Proportion of nurses to total Staff;
22	Lamkin et al., 2001; Lamkin et al., 2002	To explore how RNs perceive nurse staffing levels in oncology nursing and how they cope with staffing shortfalls	Not Cited	USA	Cross-sectional survey	185 outpatient RNs; 342 nurse executives in outpatient oncology settings	RN	Staffing	perceived staffing adequacy; agency nurse use; float nurse use
23	Lelli et al., 2015	To examine if differences exist in the levels of autonomy and job satisfaction among primary care NPs employed in retail clinics versus traditional primary care settings.	Not Cited	USA	Cross-sectional survey	310 primary care NPs	NP	Attitude	N/A
24	Levine et al., 2017	To examine if staffing in primary care-mental health of the VA health systems is related to quality of depressive care	Not Cited	USA	Cross-sectional observational /survey	Psychologists, social workers, nurses, and psychiatric medication prescribers from 349 primary care sites	RN	Staffing	FTEs
25	Lukewich et al., 2016	The purpose of this study was to examine the relation between primary care delivery models that incorporate RNs and clinical	Not Cited	Canada	Cross-sectional survey	15 primary care practices; patient sample was from adult diabetes patients	RN	Staffing	Patient-to-nurse ratios; presence of nurse

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
		outcomes of patients with type 2 diabetes.							
26	March et al., 2017	Spanish primary health care teams need to perform community activities as part of their jobs (i.e., walking groups, neighborhood meetings, school-based health programs). This study aims to identify factors related to participation in these activities	Not Cited	Spain	Case studies	304 health care teams in primary care in Spain	RN	Staffing	proportion of nurses to total staff
27	Matthews, 2005	To determine adequate nursing personnel staffing to minimize costs while still performing all tasks and duties	Not Cited	USA	Cross-sectional observational	Internal Medicine Outpatient Clinic to use as a model	RN, LPN	Staffing	Types of health workers staffed
28	Munyewende et al., 2014	The objective of the study was to determine the overall job satisfaction of primary care clinic nursing managers and the predictors of their job satisfaction in two South African provinces.	Not Cited	South Africa	Cross-sectional survey; qualitative descriptive	108 nurse managers at primary health care services.	Nurse Managers	Staffing, attitude	Perceived staffing adequacy
29	Norful et al., 2018	To understand Primary care provider (PCP) perspectives in primary care and understand how increased RN staffing impacts primary care	Not Cited	USA	Qualitative descriptive	26 PCPs (12 physicians, 14 NPs) at primary care practices	RN	Staffing	Perceived staffing adequacy
30	Perry et al., 2018	To explore antecedents and outcomes of nurse self-reported job satisfaction- and dissatisfaction-based turnover cognitions	Self Determination Theory	USA	Cross-sectional survey	2596 nurses (RNs & LPNs) at 110 army treatment facilities (hospitals & clinics)	RN, LPN	Attitude	N/A

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
31	Pietruszewski et al., 2014	To understand associations between staffing for a depression collaborative care program and enrollment and remission rates	Not Cited	USA	Cross-sectional observational	63 primary care clinics, project leaders at 12 medical groups	RN, LPN	Staffing	Types of health workers staffed
32	Pittman et al., 2016	This study explores perceptions of CEOs of community health centers (CHCs) that have a variety of staff configurations.	Not Cited	USA	Qualitative descriptive	19 CEOs of community health centers	NP, RN, LPN	Staffing	Types of health workers staffed
33	Plant & Coombes, 2003	The research aim was to discover which factors were considered relevant by practice and community nurses in the locality when they decided to take sick leave.	Not Cited	United Kingdom	Qualitative descriptive	8 primary care-based nursing staff practice nurses, district nurses, health visitors, and nurse managers	RN, Practice Nurse, District Nurse	Attitude	N/A
34	Poghosyan et al., 2017	To examine NP practice environment in primary care organizations' association with NP retention measures	Generally Organizational Theorists	USA	Cross-sectional survey	63 NPs at PC organizations	NP	Attitude	N/A
35	Russell et al., 2017	To explore turnover and retention metrics in remote Australian communities	Not Cited	Australia	Cross-sectional observational	53 remote located clinics	RN	Staffing	FTEs
36	Thompson et al., 1982	To evaluate the effectiveness of the NP program at Clinic A compared to the effectiveness of the traditional program at Clinic B	Not Cited	USA	Case studies	735 general or pelvic examinations performed at Clinic A and 685 performed at Clinic B from January to March, 197	NP	Staffing	Types of health workers staffed

	Citation	Purpose	Theory	Country of Origin	Design	Setting/Sample	Nurse Type	Model Construct	Nurse Staffing Measure (if applicable)
37	van der Biezen et al., 2016	To provide insight into the impact of substituting general practitioners with NPs in out-of-hours services on (1) the number of patients and (2) general practitioners' caseload (patient characteristics, urgency levels, types of complaints). Background.	Not Cited	Netherlands	Quasi-experimental study	12,092 patient data from medical records in primary care general practitioner's cooperative	NP	Staffing	Types of health workers staffed
38	Vindigni et al., 2014	To assess the feasibility of utilizing a small-scale, low-cost, pilot evaluation in assessing the short-term impact of Kenya's emergency-hire nursing program (EHP) on the delivery of health services (outpatient visits and maternal-child health indicators) in two underserved health districts with high HIV/AIDS prevalence.	Not Cited	Kenya	Qualitative descriptive	One key informant interview was also conducted with a convenience sample of medical, nursing, and clinical officer managers at each site (n = 13)	RN	Staffing, attitude	Nurse staffing in public facilities
39	Zhao et al., 2019	To compare the costs of turnover among nurses and to compare the costs of agency-employed nurses	Not Cited	Australia	Cross-sectional observational	99 Departments of Health remote-health clinics	RN	Staffing	FTEs; agency nurse use

Nurse Staffing and Outcomes in Outpatient Settings

Table 2.2 synthesizes the findings of this section through an overview of the relationship between nurse staffing, nurse attitudes, and organizational outcomes. Twenty-nine articles addressed the relationship between nurse staffing and outcomes in outpatient settings, including a mix of quantitative (n=22) and qualitative (n=7) articles. Multiple types of nurse staffing measures were reported in studies that examined relationships between nurse staffing and outcome (most to least frequently reported): perceived staffing adequacy (n=10), types of health care workers staffed (i.e., skill mix) (n=9), full time equivalent nurses (n=7), nurse staffing in public facilities (n=2), skill mix or proportion of nurses or total staff (n=2), presence of nurses on health care team (n=1), and patient to nurse ratios (n=1). Two other areas related to nurse staffing were found, nurse vacancies (n=2) and the rate of full time equivalent (FTE) agency/float nurse use (n=2). All definitions of these terms can be found in Appendix B. The remainder of this section will be organized by nurse-staffing measures and associated outcomes to allow for easier comparison between similar studies and to report the main measures of nurse staffing reported across studies. Each staffing measure reported in the included studies is consistent with the ICN definition of nurse staffing.

Perceived Staffing Adequacy

The most common outpatient nurse-staffing measure recorded in this review was perceived staffing adequacy. Of the five studies that used perceived staffing adequacy to measure the relationship between nurse staffing and outcomes, four measured nurse staffing as part of a semi-structured qualitative interview, and one measured nurse staffing quantitatively as part of a cross-sectional survey.

One qualitative study of 73 primary care providers and staff in the US reported that health workers in primary care perceived that RN and LPN short staffing was associated with increased RN and LPN turnover and decreased ability of providers and staff to deliver care (Chuang et al., 2017). The results of a second qualitative study of 108 nurse managers showed that nurse managers in South African primary care services perceived that lower staffing levels were associated with an unbearable workload (Munyewende, Rispel, & Chirwa, 2014). A third qualitative study of 26 primary care providers in the US reported that RNs reduced physician workload and the strain involved in single-handedly completing all care management tasks, simultaneously increasing patient safety and quality of care (Norful, Dillon, Ye, & Poghosyan, 2018). Lastly, 46 RNs in rural Australia reported that they perceived staffing adequacy as also requiring the right number of nurses with the right competencies and teamwork abilities, otherwise the staff was unsuitable to alleviate the staffing shortage (Dunbar, Bourke, & Murakami-Gold, 2019).

The one cross-sectional survey of nurses and health care workers that was conducted examined an outpatient oncology clinic. In this study of 242 oncology nurses, the likelihood of nurses being exposed to chemotherapy decreased when nurses reported higher scores of staffing adequacy on the practice environment scale of nursing work index (PES-NWI) (Friese, Himes-Ferris, Frasier, McCullagh, & Griggs, 2012). Across both qualitative and quantitative measures of perceived staffing adequacy, higher levels of nurse staffing were associated with more positive organizational outcomes.

Types of Health care Workers Staffed (Skill Mix)

Studies that observed which type of health care workers staffed clinics were included in the measure *types of health care workers staffed*. Numbers were noted, as were the proportion of nurses to total staff, or a comparison of staffing NP versus staffing physicians.

Several studies reported staffing different types of health care workers to examine the cost savings associated with certain staff skill mixes. When comparing physician and NP staffing, a study of 2518 primary care practices illustrated that clinics that utilized NPs increased net revenues when the NP required limited MD consultation or when NP reimbursement rates increased (Basu, Landon, Song, Bitton, & Phillips, 2015). Similarly, when comparing a clinic staffed with NPs and physicians to one only staffed with physicians, another study demonstrated that there were lesser unit costs at the clinics that staffed NPs (Thompson, Basden, & Howell, 1982). In a study of 2500 primary care practices across the US, clinics that reported using chronic care management performed by nurses (RNs and LPNs) instead of physicians had lower costs than those where physicians managed care. Chronic care management sites using RNs and LPNs reported cost savings of $332 per enrolled patient per year when using RNs and $373 per enrolled patient per year savings when using LPNs (Basu, Phillips, Bitton, Song, & Landon, 2015). This translates to lower cost when using nurses (RNs, LPNs and NAs) for chronic disease management compared to using physicians. For one outpatient clinic, a model predicted that staffing 11 nurses instead of 13 would generate a 16% reduction of costs while still allowing nurses to be optimally productive (Matthews, 2005). In terms of quality, the included studies vary in sample size, and it should be noted that two of these studies were published more than 15 years ago. Overall, evidence supports the use of nurse practitioners and nurses in proper levels to save costs in outpatient health facilities.

The types of health care workers staffed were also examined relative to patient satisfaction. An older study, published early in the employment of NPs, compared three clinics to observe differences in cost effectiveness and patient satisfaction. The first was a physician-managed clinic, the second a physician-NP hybrid clinic, and the third an NP-managed clinic. No differences in patient satisfaction were found between the three clinics (Graveley & Littlefield, 1992); therefore, no differences based on staffing with NP or physicians were found in patient satisfaction. This finding differed from the results of another study that compared a physician-NP clinic to a physician only clinic, as the study reported higher patient satisfaction for the physician-NP staffed model (Thompson et al., 1982). It should be noted that both of these studies are over 20 years old, and NP roles have evolved greatly in the US since then. Another study compared a clinic with one NP and four general practitioners to a control clinic with five general practitioners. This study found that nurse practitioners were able to see similar numbers of patients and that physician workload did not change when staffing a nurse practitioner (van der Biezen et al., 2016). Overall, these results indicate that clinics that staff NPs as an alternative to other types of health workers report the same or higher levels of patient satisfaction, and they demonstrate that physician workload did not change when staffing nurse practitioners.

Lastly, staffing nurses compared to other health worker types was also studied in relation to patient outcomes. No differences were reported in maternal or neonatal patient outcomes between a physician only clinic, a physician-NP mixed clinic, and a NP only clinic (Graveley & Littlefield, 1992). The quality of this study is reduced by a small sample size, which compares only three clinics, and by the publication date, which may not be relevant or generalizable. Another study comparing staffing between 63 primary care clinics of various types of primary care mental health nurses found no differences in depression remission rates for patients seen by

an RN, LPN, or medical assistant (Pietruszewski, Mundt, Hadzic, & Brown, 2015). Findings from these two studies indicate that using various staffing skill mixes may not make a difference in patient outcomes.

Evidence varied from these studies on types of health care workers staffed. These findings suggest that a higher use of NPs and RNs relative to total staff could result in cost savings for the health facility. In addition, higher staffing of NPs relative to total staff could have higher levels of patient satisfaction or even neutral impact without affecting physician workload. Lastly, higher staffing of NPs or RNs relative to other staff appears to make no difference on patient outcomes.

FTEs

Nurse FTEs were measured in relation to patient satisfaction, turnover of nurses, and patient outcomes. One study with a large sample of 7,061 patients in primary care facilities in Canada measured NP and RN FTEs in relation to patient satisfaction. The results reflect an increase in NP FTEs, which was associated with increased patient satisfaction. Even as clinic wait times were reduced, there was no association between RN FTEs and patient satisfaction (Ammi, Ambrose, Hogg, & Wong, 2017). The association between nurse FTEs and patient satisfaction in outpatient settings is therefore inconclusive.

A study from 53 remotely located Australian clinics observed the relation between nurse FTEs and turnover. Results reported annual turnover rates of RNs was negatively correlated with RN FTE-to-patient ratios (Russell et al., 2017), suggesting that a larger RN FTEs-to-patient ratio is associated with less turnover.

Nurse FTEs were also studied in relation to patient outcomes in outpatient settings. The first study of 7,456 primary care practices in the UK found an association between higher RN

FTEs and lower hospital admission rates for asthma and COPD (Griffiths, Murrells, Dawoud, Jones, et al., 2010). Similarly, in a study of 8,409 general practices in the UK, there was a positive relationship between higher RN FTEs and higher quality of care scores for COPD, diabetes, and hypothyroidism (Griffiths, Maben, & Murrells, 2011). Both of these studies support a positive relationship between higher RN FTEs and better chronic disease management with large sample sizes. However, in a US study of 349 mental health primary care sites, a higher RN FTEs-to-patient ratio was negatively associated with patient engagement in psychotherapy (Levine, McCarthy, Cornwell, Brockmann, & Pfeiffer, 2017). Levine et al. (2017) suggested that this negative association may be because nurses were not the ones directly providing the psychotherapy and that this nursing team may need additional mental health training. Therefore, evidence is mixed on the association between higher RN FTE-to-patient ratios and patient outcomes, with two studies supporting more positive patient outcomes in regards to high RN FTE-to-patient ratios and one study in a mental health care setting associating higher RN FTE-to-patient ratios with lower patient outcomes. Additionally, these outcomes vary between physical and mental health, which may reflect different relationships with RN FTEs.

These studies reveal mixed results related to nurse FTEs in relation to patient satisfaction, turnover, and patient outcomes. RN FTE-to-patient ratios were not associated with patient satisfaction, even though higher NP FTEs were associated with greater patient satisfaction. Higher RN FTE-to-patient ratios were also associated with less turnover and better chronic disease management of asthma, COPD, diabetes, and hypothyroidism. However, higher RN FTE-to-patient ratios were associated with less engagement in psychotherapy in mental health primary care services.

Nurse Staffing in Public Facilities

Two studies in this scoping review measured nurse staffing, reported as the number of nurses staffed at publicly run health facilities in countries with public health sectors. In a cross-sectional survey in Indonesia, increasing the number of RNs at public health facilities was associated with increases in quality of care (Barber, Gertler, & Harimurti, 2007). In a qualitative study of 13 key health care stakeholders (medical, nursing, and clinical officer staff), all types of staff perceived that increased RN staff at public facilities would allow for more specialized HIV/AIDS services, including testing of patients and their partners, disease management, and education on prevention (Vindigni et al., 2014). These study designs, including a cross-sectional survey as well as a qualitative study of 13 stakeholders, explore the perceived impact of staffing on outcomes, which, although not an objective measure of the number of nurses staffed, may suggest the importance of staffing in public facilities. Both these studies indicate that greater numbers of nurses in public health facilities lead to the positive organizational outcomes of increased quality of care and more specialized management of HIV/AIDS.

Nurse Vacancies

Nurse vacancies were measured in two studies. A quality improvement project conducted in an outpatient chemotherapy clinic found that, by hiring additional part time RNs to fill nurse vacancies, the clinic could stay open a greater number of hours and increase the number of patients seen per day from 92 to 108 (Gruber, Smith, O'Neal, Hennessy, & Therrien, 2008). This was a sample of only one clinic, and this study's results may be limited by its lack of generalizability. In a cross-sectional survey of 3,705 ambulatory oncology nurse clinics, RN vacancies existed at 47% of the clinics, and 23% of facilities experiences increased turnover due to shortages in RN staffing (Ireland, DePalma, Arneson, Stark, & Williamson, 2004). Although

this study is limited because it is cross-sectional, it has a large sample size that makes it possible to draw conclusions about the associations between vacancies and turnover. These findings could mean that filling RN vacancies can lead to greater productivity of a facility and decreased turnover of nurses.

Proportion of Nurses to Total Staff

Two studies measured nurse staffing as the proportion of nurses to total staff at the clinic in outpatient settings. In one study of 88,682 patients, it was reported that having a higher proportion of NPs to total provider staff in primary care facilities in the US Veterans Affairs system was associated with a 0.25% reduction in HbA1c scores for diabetic patients (Jackson, Lee, Edelman, Weinberger, & Yano, 2011). In 304 community based primary care teams in Spain, a higher proportion of RNs on the primary health care team was associated with greater community health promotion involvement among nurses (March et al., 2017). Both articles had large sample sizes, making it possible to draw conclusions about the associations between proportions of nurses to total staff and between chronic disease management and nurse outcomes. According to the literature reviewed, higher proportions of nurses relative to the health care team seem to be associated with better diabetes outcomes and increased nurse involvement in community health promotion.

Agency and Float Nurse Use

The use of agency and float nurses to address nurse vacancies or shortages was a staffing measure reported in two studies. In a study of 99 remote outpatient health facilities in Australia, a lower number of FTE agency nurses was associated with lower costs and was less strongly associated with fewer years of life lost (Zhao et al., 2019). In a cross-sectional survey exploring how RNs perceived agency and float nurses as alternatives to short staffing, 59% of nurses

reported that agency nurses provided a lower quality of care, and 52% of nurses believed that float nurses provided a lower quality of care (Lamkin, Rosiak, Buerhaus, Mallory, & Williams, 2001, 2002a). This study only observed nurses' perceptions on agency and float nurses, and, therefore, the results could have been biased compared to an objective measure of agency or float nurses use. However, based on these findings, use of agency or float nurses is a measure of staffing because it indicates that the facility is unable to staff fully with their primary staff. Both studies, each of which measured the use of nurse staffing and agency or float nurses, indicated that an increased use of these types of nurses was associated with worse organizational outcomes. This result implies that staffing by primary staff is related to better outcomes.

Presence of a Nurse on Health Care Team

The presence of at least one nurse on the health care team was a measure in one study. In a cross-sectional survey of 15 primary care facilities in Canada, primary care practices with at least one RN in comparison to those with no RNs were more likely to have better patient outcomes associated with blood pressure control, low-density lipoprotein cholesterol, HbA1c levels, and fasting blood glucose levels (JLukewich, Edge, VanDenKerkhof, Williamson, & Tranmer, 2016). It is unclear if 15 clinics was adequate enough to answer this study's research question, as no power analysis was reported for this seemingly small sample size. The presence of at least one RN on a health care team, therefore, was associated with better patient outcomes in outpatient services.

Patient-to-Nurse Ratios

Patient-to-nurse ratio was used as a measure in one study. In a cross-sectional survey of 15 primary care facilities in Canada, practices with lower ratios of diabetic patients per RN had patients with better HbA1c and fasting plasma glucose levels than did practices with higher

ratios of diabetic patients per RN (Lukewich, Edge, VanDenKerkhof, Williamson, & Tranmer, 2016). This survey indicates that higher ratios of nurses to patients are associated with better patient outcomes.

Summary of Nurse Staffing and Outcomes

Using a variety of nurse staffing measures and organizational outcomes, table 2.2 summarizes the literature reviewed and shows the association between each nurse staffing measure and its organizational outcomes. Several measures of nurse staffing were used, which were linked to different organizational outcomes, including patient, nurse, and organizational performance outcomes. These nurse staffing measures included perceived staffing adequacy, types of health care workers staffed (skill mix), FTE nurses, nurse staffing in public facilities, skill mix or proportion of nurses to total staff, presence of nurses on health care teams, patient-to-nurse ratios, nurse vacancies, and rate of FTE agency and float nurse use. Neither nursing hours per patient day nor the WISN tool were used in outpatient nurse staffing research as measures of nurse staffing.

Analysis of the included studies suggested that higher nurse staffing in outpatient settings was associated with better patient outcomes (Griffiths et al., 2011; Lukewich et al., 2016), lower costs (Basu, Landon, et al., 2015; Basu, Phillips, et al., 2015), and lower nurse turnover (Chuang et al., 2017). Several studies on types of health workers staffed indicated that staffing NPs, when compared to staffing only physicians, had no impact on patient satisfaction (Graveley & Littlefield, 1992), the number of patients treated at the clinic (van der Biezen et al., 2016), or on patient maternal outcomes (Graveley & Littlefield, 1992). Only one study reported that better nurse staffing had a negative impact on outcomes. Increased numbers of RN FTE were associated with less patient engagement in psychotherapy, indicating that perhaps additional

mental health training is needed for these nurses (Levine et al., 2017). More research is needed to help further explain this finding and to more definitively understand the relationship between RN FTEs and patient outcomes related to chronic disease management in mental health outpatient settings. However, for all other settings, higher numbers of RN and NP FTEs were associated with better management of chronic diseases.

Nurse Staffing and Nurse Attitudes in Outpatient settings

Seven articles, both quantitative (n=3) and qualitative (n=4) studies, examined the relationship between nurse staffing and nurse attitudes in outpatient settings. The three quantitative studies had a minimum sample size of at least 101 health care workers, and the qualitative studies had a minimum sample size of 13 health care workers.

In the literature associated with nurse staffing, only two nurse job attitudes (job satisfaction and nurse burnout) were reported. Table 2.2 summarizes the relationships between nurse staffing and both organizational outcomes and nurse attitudes. All nurse attitudes are bolded and starred. Of the seven studies that examined the relationship between nurse staffing and nurse attitudes, four observed job satisfaction, and three examined nurse burnout. Nurse-perceived staffing adequacy was the staffing measure used for six of the studies. Nurse staffing at public facilities was used as a measure for one study.

Perceived Staffing Adequacy

In a cross-sectional survey of 402 outpatient oncology nurses, a positive relationship was reported between a perceived staffing adequacy and job satisfaction (Friese & Himes-Ferris, 2013). In a second cross-sectional survey of 319 nurses and NPs in outpatient ambulatory care, a similar relationship was reported between perceived staffing adequacy and job satisfaction (Friese, Siefert, Thomas-Frost, Walker, & Ponte, 2016). These cross-sectional studies with large

sample sizes indicate a positive relationship between higher nurse staffing and higher nurse job satisfaction in outpatient settings.

Two qualitative studies also addressed nurses' perceptions of staffing adequacy and job satisfaction. A qualitative study of 101 RNs in 35 focus groups working in an outpatient hemodialysis unit found that nurse-perceived increased time pressure and staffing inadequacy led to nurses feeling dissatisfied (Gardner & Walton, 2011). The second qualitative study used semi-structured interviews of 108 nurse managers in South African primary care facilities to examine job satisfaction in primary care clinics. Nurse managers perceived that units experiencing staffing shortages had greater job dissatisfaction among their nurses than did units without shortages (Munyewende et al., 2014). Both these qualitative studies, both with large samples, indicate that inadequate staffing is perceived to be associated with job dissatisfaction by nurses.

The relationship between health worker-perceived staffing adequacy and burnout was also examined. In a qualitative study of 73 primary care providers that explored barriers to providing primary care to women veterans, nurses described short staffing as a reason for their feelings of burnout (Chuang et al., 2017). Findings from a cross-sectional study of 777 primary care providers and nurses indicated that appropriate nurse staffing (measured by nurses' responses to a yes/no question about whether staffing was at the number of FTEs recommended for their facility) was negatively related to nurse burnout (Edwards et al., 2018). These two studies suggest that higher perceived nurse staffing is related to less nurse burnout.

Nurse Staffing in Public Facilities

Only one study focused on understanding the impact of increasing the number of nurses working in public facilities, a qualitative study interviewing 13 key informants. The findings indicated that increasing the number of nurses allowed nurses to specialize in a needed area of

care and that nurses no longer needed to cover multiple departments. In turn, the nurses perceived that nurses experienced less burnout (Vindigni et al., 2014), suggesting that increased nurse staffing in public facilities is perceived by key health care informants to have a relationship with less burnout.

Summary of Literature on Nurse Staffing and Nurse Attitudes

Few studies examined the relationships between nurse staffing and nurse attitudes. The most common measure used to assess nurse staffing was perceived staffing adequacy; however, no research was published with objective staffing measures, such as FTEs or nursing hours per patient day. In addition, the relationship between nurse staffing and two indicators of nurse attitudes were reported in the literature, nurses' job satisfaction and burnout. The lack of data reported on nurse attitudes represents a concerning gap in the literature about the relationship between nurse staffing and nurses' other job attitudes.

Table 2.2

The Relationship Between Nurse Staffing and Nurse Attitudes and Organizational Outcomes

Nurse Staffing Measures	Outcome Measures in the Literature
Perceived staffing adequacy	· Burnout (Chuang et al., 2017; Edwards et al., 2018)* · Job satisfaction (Gardner & Walton, 2011; Munyewende et al., 2014; Friese & Himes-Ferris, 2013; Friese et al., 2016)* · Ability to deliver care (Chuang et al., 2017) · Turnover (Chuang et al., 2017) · Nurse workload (Munyewende et al., 2014) · Physician workload (Norful et al., 2018) · Quality of care/ patient safety (Norful et al., 2018) · Nurse reported chemotherapy exposure (Friese et al., 2012)
Types of health workers staffed	· Costs (Basu et al., 2015a ; Basu et al., 2015b; Matthews, 2005; Pittman et al., 2016; Thompson et al., 1982; Graveley & Littlefield, 1992) · Patient centeredness (Pittman et al., 2016) · Patient satisfaction (Thompson et al., 1982; Graveley & Littlefield, 1992) · Quality of care (Thompson et al., 1982) · Patient wait times (Thompson et al., 1982) · Physician workload (Aita et al., 2001; van der Biezen et al., 2016) · Number of patients seen (van der Biezen et al., 2016)

Nurse Staffing Measures	Outcome Measures in the Literature
	· Maternal and neonatal physiological variables (Graveley & Littlefield, 1992) · Depression outcomes/remissions (Pietruszewski et al., 2014)
FTEs	· Patient satisfaction (Ammi et al., 2017) · Quality of care (Griffiths et al., 2011) · Non-elective hospital admissions (Griffiths et al., 2010) · Depression outcomes; antidepressant receipt; adequacy of antidepressant receipt; psychotherapy receipt & engagement (Levine et al., 2017) · Nurse turnover (Russell et al., 2017) · Physician workload (Aita et al., 2001)
Nurse staffing in public facilities	· Burnout (Vindigni et al., 2014)* · Quality of care (Barber et al., 2007) · Maternal patient outcomes (Vindigni et al., 2014)
Nurse vacancies	· Number of patients seen a day (Gruber et al., 2008) · Turnover (Ireland et al., 2004)
Proportion of nurses to total staff	· Diabetes outcomes (HbA1c) (Jackson et al., 2011) · Team involvement in community activities (March et al., 2017)
Agency and float nurse use	· Population years of life lost (Zhao et al., 2019) · Costs (Zhao et al., 2019) · Quality of care (Lamkin et al., 2001; Lamkin et al., 2002)
Presence of nurse	· Diabetes outcomes (HbA1c; fasting plasma glucose; low-density lipoprotein) (Lukewich et al., 2016)
Patient to Nurse ratios	· Diabetes outcomes; HbA1c; fasting plasma glucose; low-density lipoprotein (Lukewich et al., 2016)

**Indicates that this is a job attitude outcome and will be discussed in the following section.*

Nurse Attitudes and Outcomes in Outpatient settings

In the literature, only six studies were identified that reported an evaluation of the relationship between nurses' attitudes and organizational outcomes in outpatient settings. Again, only two variables—job satisfaction and burnout—were reported as associated with organizational outcomes; five studies evaluated the impact of nurses' job satisfaction on outcomes, and one study evaluated the impact of nurse burnout on outcomes. Five studies used quantitative designs, and one used a qualitative method.

Job satisfaction and burnout was reported to be associated with various organizational outcomes in outpatient settings. The first of these outcomes is intent to leave. Low outpatient primary care NPs' job satisfaction was associated with the organizational outcome of intent to change jobs in a cross-sectional survey of 143 nurse practitioners (Celentano, 1978). However, it should be noted that this study was published in 1978 and may not reflect the NP workforce today. In another study, 310 outpatient NPs who reported higher levels of satisfaction also reported lower levels of intent to leave their jobs (Lelli, Hickman, Savrin, & Peterson, 2015). Similarly, in a survey of 175 RNs working in primary care, a one unit increase in job satisfaction was associated with RNs being 66% less likely to consider leaving their jobs (Delobelle et al., 2011). Another cross-sectional survey of 63 NPs in primary care demonstrated that job satisfaction increased about 20%, commensurate with similar decreases in nurses' intention of turnover (Poghosyan, Liu, Shang, & D'Aunno, 2017). A survey of 2,596 RNs and LPNs indicated that nurses perceived dissatisfaction-based desire to quit was associated with patient falls in outpatient settings (Perry, Richter, & Beauvais, 2018). According to these studies, positive job satisfaction was associated with more positive organizational outcomes, and job dissatisfaction was associated with more negative organizational outcomes. Lastly, the only study examining nurse burnout, a qualitative study of 8 RNs in outpatient settings, reported that burnout was associated with increased prevalence of nurses' absenteeism (Plant & Coombes, 2003). Burnout was therefore associated with the negative organizational outcome of nurses' increased desire to take sick leave. Table 2.3 provides a summary of the literature on the relationship between nurse attitudes and organizational outcomes.

Table 2.3

Summary of Nurse Attitudes and Organizational Outcomes in Outpatient Facilities

Nurse Attitude	Outcomes
Job satisfaction	· Less intent to change job (Celentano, 1978; Delobelle et al., 2011; Lelli et al., 2015) · Decreased turnover (Poghosyan et al., 2017)
Job dissatisfaction	· Increased number of patient falls (Perry et al., 2018)
Burnout	· RN wanting to take sick leave (Plant & Coombes, 2003)

Summary of the literature on Nurse Attitudes and Outcomes

Of the small body of research on nurse attitudes and outcomes in outpatient settings, only one study reported relationships between nurse attitudes and patient outcomes; the majority of literature discussed the relationship between nurses' job satisfaction and either their intent to leave their jobs or turnover. Like the literature on nurse staffing and nurse attitudes, few attitudes were reported as variables in the literature (only job satisfaction and burnout are mentioned), leaving a gap in knowledge about the range and scope of nurses' job attitudes and about the relationship between nurse attitudes and diverse measures of organizational outcomes in primary care.

Discussion

This scoping review of the literature on nurse staffing, nurse attitudes, and organizational outcomes provides insights into how nurse staffing and attitudes affect organizational outcomes in outpatient health care settings. The literature reviewed was organized based on the JD-R, which proposes relationships between the job demand or resource of nurse staffing and organizational outcomes, both of which are mediated by nurse attitudes (Bakker & Demerouti, 2007; Demerouti et al., 2001). Accordingly, the literature was organized into areas specific to the

relationships between nurse staffing and outcomes, nurse staffing and nurse attitudes, and nurse attitudes and outcomes. Findings are interpreted within each of these areas.

Nurse Staffing and Organizational Outcomes

Results of the scoping review support the direct relationship between nurse staffing and organizational outcomes proposed by the JD-R (Bakker & Demerouti, 2007; Demerouti et al., 2001). Specifically, when nurse staffing in outpatient settings is adequate, patient outcomes are improved (Griffiths et al., 2011; Lukewich et al., 2016), costs are lower (Basu, Landon, et al., 2015; Basu, Phillips, et al., 2015), and nurse turnover declines (Chuang et al., 2017). By counter point, the addition of nurses was related to lower patient engagement in psychotherapy (Levine et al., 2017). While the meaning of this finding is unclear, further research is needed to understand the mechanisms through which nurse staffing affects patient engagement in mental health settings.

Nurse Staffing and Nurse Attitudes

Consistent with the JD-R, the major findings of this scoping review largely supported a positive relationship between nurse staffing and nurses' attitudes about their jobs (Bakker & Demerouti, 2007; Demerouti et al., 2001). In all studies that operationalized nurse staffing as perceived staffing adequacy, nurse staffing was positively associated with job satisfaction for nurses and NPs working in outpatient settings (Gardner & Walton, 2011; Munyewende et al., 2014; Friese & Himes-Ferris, 2013; Friese et al., 2016). In another study, nurse staffing conceptualized as perceived appropriate staffing was negatively associated with nurse burnout (Edwards et al., 2018). As suggested by the JD-R, these findings indicate that there is a positive relationship between nurse staffing adequacy and nurses' job satisfaction and a negative

relationship between inadequate nurse staffing and nurse burnout (Bakker & Demerouti, 2007; Demerouti et al., 2001).

While there was support for the relationship between nurse staffing and nurse attitudes, more research is still needed to understand how nurse staffing measures affect diverse nurse attitudes measures. Nurse staffing was measured primarily as health worker-perceived staffing adequacy, a measure that is subjective according to the perceptions of different types of health workers. To produce more robust findings, the use of objective measures such as FTEs, the WISN tool, or HPPD is strongly recommended in future research, as this scoping review did not find that any of these had been used to measure nurse staffing in outpatient settings in the existing research.

In addition, the literature reports inpatient nurse attitudes of job satisfaction, organizational commitment, nurse leadership, engagement, work motivation, and burnout have been researched (Chu & Hsu, 2011; Keyko, Cummings, Yonge, & Wong, 2016; Rahiman & Kodikal, 2017; Van Bogaert et al., 2017). In comparison, the published literature in outpatient nurse staffing and nurse attitude research yields only two nurse attitude measures, job satisfaction and burnout. Future research on the relationship between nurse staffing and nurse attitudes would be strengthened by expanding the types of measures used for both nurse staffing and nurse attitudes.

Of these nurse attitude studies in outpatient settings, all research was done using quantitative methods. While quantitative methods are an effective way to observe relationships between concepts, they fail to capture nurses detailed perceptions of their job attitudes. Qualitative research on nurse attitudes may provide greater clarity regarding the nuances of nurse attitudes in outpatient settings.

Attitudes and Organizational Outcomes

This scoping review supports the JD-R's proposed relationships between positive nurse attitudes and improved organizational outcomes as well as the inverse relationship between nurse attitudes and organizational outcomes. Findings in the literature consistently report that nurses' job satisfaction is associated with lower intent to change jobs or actual turnover (Celentano, 1978; Delobelle et al., 2011; Lelli et al., 2015; Poghosyan et al., 2017). Further, both decreased nurse job satisfaction and higher levels of nurse burnout are associated with an increase in patient falls and an increase in nurses' desire to take sick leave (Perry et al., 2018; Plant & Coombes, 2003). Although these findings generally support the hypotheses in the JD-R, the limited number of published studies prevents generalizability.

Only two types of nurse attitudes were found in the literature that studied the relationship between nurse attitudes and outcomes. Again, in inpatient settings, job attitudes have been conceptualized as job satisfaction, organizational commitment, nurse leadership, engagement, work motivation, and burnout (Chu & Hsu, 2011; Keyko et al., 2016; Rahiman & Kodikal, 2017; Van Bogaert et al., 2017). However, in research that observed outcomes associated with job attitudes, only job satisfaction and burnout were studied in outpatient settings. Thus, gaps remain in the literature that defines the relationships between a variety of nurse attitudes and organizational outcomes.

Limitations

Overall, this review was limited by the lack of existing literature examining the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings. Only three studies included in this review were guided by a theory, which reflects a major shortcoming of existing research. Most of the reported study designs were cross-sectional

in nature. Future research should both be guided by theory and employ more robust designs, such as longitudinal designs, to help advance knowledge of the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings. In addition, most studies utilized only descriptive statistics. More quasi-experimental and experimental designs would strengthen this body of research.

As for additional limitations, first, this study focused exclusively on the job demand or resource of nurse staffing. By having this singular focus, this study was not able to examine other important job demands and/or resources to understand more fully how other job demands or resources affect nurse attitudes. Predictors of job satisfaction in outpatient settings reported in the literature include nurse salaries (Alhyas, Nielsen, Dawoud, & Majeed, 2013; Chung-Park, 1998), client relationships (Alhyas et al., 2013; Ashley, Peters, Brown, & Halcomb, 2018; Gardner & Walton, 2011; Pilpel & Naggan, 1988), collegial relationships (Ashley et al., 2018; Friese, 2012; Friese et al., 2016; Li et al., 2016), management support (Friese et al., 2016; Kamimura, Schneider, Lee, Crawford, & Friese, 2012; Kaunonen, Salin, & Aalto, 2015), and nurse-perceived workload (Alenezi, Aboshaiqah, & Baker, 2018; Dugani et al., 2018; Edwards et al., 2018; Engelbrecht, Bester, Berg, & Rensburg, 2008; Helfrich et al., 2017; Huengsberg, Vedhara, Nott, & Bradbeer, 1998; Rout, 2000). Predictors of increased burnout include high workload and time pressure (Dugani et al., 2018; Edwards et al., 2018; Engelbrecht et al., 2008). Burnout decreased when nurses were taught mindfulness relaxation (Duhoux, Menear, Charron, Lavoie-Tremblay, & Alderson, 2017). These variables should be thoughtfully considered as either a job demand or resource in future applications of the JD-R, depending on how they are conceptualized and measured. Studies that integrate these variables could help the nursing

profession understand whether these predictors help explain the JD-R's hypothesized relationships in outpatient settings and even across different countries.

Recommendations

Based on the findings of this study, the following recommendations for outpatient settings are made to policymakers:

1. Nurse staffing regardless of measure is positively associated better patient, financial, and nurse outcomes. Therefore, increasing nurse staffing in a facility is recommended to achieve better organizational outcomes.
2. Nurse staffing, specifically measured as perceived staffing adequacy and nurse staffing in public facilities, is positively associated with the nurse attitude of job satisfaction and negatively associated with the nurse attitude of burnout. Therefore, it is especially important to invest in interventions to improve nurse staffing at outpatient facilities because they may have a positive impact on nurses' attitudes toward their jobs.
3. The nurse attitude of job satisfaction is associated with lower turnover of nurses and fewer patient falls, and nurse burnout is associated with nurse absenteeism. Therefore, direct investments in improving nurses' attitudes toward their jobs is important for improving organizational outcomes in outpatient settings.

Key relationships hypothesized by the JD-R are supported by the literature, and I recommend interventions to improve nurse staffing and nurse attitudes in order to improve organizational outcomes in outpatient settings. However, the literature was lacking information on the mediating effect of nurse attitudes and on the relationship between job resources, demands, and organizational outcomes. Nevertheless, findings from this review suggest that

nurse staffing is associated with nurse attitudes and that both nurse staffing and nurse attitudes are associated with organizational outcomes. Therefore, policies focusing on both improving nurse staffing and interventions improving nurse attitudes are warranted.

This review also identified several recommendations for future research:

1. Future research should incorporate theory into nurse staffing and nurse attitudes research in outpatients' settings.
2. The use of objective nurse staffing measures, such as FTE, WISN tool or HPPD, is strongly recommended for use in future research.
3. A closer examination of nurse attitudes, beyond job satisfaction and burnout, is needed in outpatient settings. These attitudes include motivation at work, engagement at work, and frustrations at work.
4. Qualitative research is needed to better explain and understand nurse attitudes in outpatient settings. Only quantitative studies reported nurse attitudes in outpatient settings.
5. Future research should explore how and whether nurse attitudes mediate the relationship between nurse staffing and organizational outcomes, as hypothesized in the JD-R. Although findings predict this relationship, no research has specifically focused in this hypothesis.

Because of the impact on organizational outcomes, it is important to advance this area of study to combat the dearth of studies on nurse staffing and nurse attitudes. Following these recommendations for future research will promote a better understanding of nurse staffing and nurse attitudes in primary care, which will continue to inform policymakers on how to achieve the best organizational outcomes possible.

Conclusions

This review found that nurse staffing affects both nurse attitudes and organizational outcomes. Unfortunately, gaps exist in the literature. These gaps included the lack of objective measures of nurse staffing, such as FTEs, WISN or HPPD. Moreover, only two types of nurse attitudes were reported in outpatient settings, leaving more research to be done to explain the perceptions of nurses in outpatient settings about their attitudes toward their jobs. Lastly, a major omission in the literature was the lack of studies that examined the mediating effects of nurse attitudes on the relationship between nurse staffing and organizational outcomes. Despite the need for future research, this review suggests that policymakers can improve nurse staffing and improve nurse attitudes by implement interventions and policies at their organizations. These changes can lead to the best possible impact on organizational outcomes at their facilities.

CHAPTER 3 (PAPER 2): THE RELATIONSHIP BETWEEN NURSE STAFFING AND HIV OUTCOMES IN NAMIBIA

Namibia is a country in Sub-Saharan Africa that has been reporting severe shortages of nurses. As of 2015, Namibia had only 61% of the workload-based nursing requirement that it needed, with an inequitable distribution of equipment between hospital and clinics, and with staffing skewed toward hospitals (Titus et al., 2015). Public clinics had only 36% of the required nurse staffing based on workload (Titus et al., 2015). Nurses in health centers and clinics are particularly important to provide primary health services in Namibia, because nurses alone staff these clinics and because, in 2016, nurses became able to initiate prescription of HIV medications with requisite training certificate. This change made nurses key providers in HIV services in Namibia. This role is especially important in small clinics where the staffing consists of one nurse, as that nurse may be the only provider on site to deliver HIV services, including prescribing and managing HIV medications. Without nurses, then, patients may not get the care that they need. Because of their critical role in these settings, nurses are an essential part of Namibian HIV/AIDS health services.

Namibia has a high prevalence of HIV among its population, with approximately 12.6% of its population reported as living with HIV, and with some regions having an HIV prevalence as high as 22.3% (Phia Project, 2017). The goal of HIV services in Namibia is to achieve epidemic control of HIV at a community, regional, and country level. Epidemic control requires meeting the 90-90-90 goals of HIV care set by Joint United Nations Program on HIV/AIDS (UNAIDS, 2017b). This goal states that 90% of people living with HIV know their HIV status,

90% of diagnosed HIV infections are on ART, and 90% of individuals on treatment have a suppressed viral load (UNAIDS, 2017a). To achieve these goals, all at-risk Namibians must be tested for HIV, those who are found to be positive must be started on ART medications, and their viral loads must be checked and documented on a regular basis to make sure that treatment is working and that their viral loads are becoming suppressed.

The goal of HIV care and treatment is to have all people living with HIV have a suppressed viral load. A suppressed viral load means that the virus within a person's body is at such a low level that the symptoms of HIV do not worsen. The US Center for Disease Control and Prevention (CDC) states that viral loads at suppressed or undetectable levels pose effectively no risk of transmission to others (CDC, 2020). In 2017, 77.4% of those on HIV medications in Namibia had suppressed viral loads, lower than the 90% goal (Phia Project, 2017). By increasing the demands on health care facilities and on those who work in them, this disease burden in the population strains the health system.

When people living with HIV are identified, know their HIV status, and are maintained on an ART therapy that works for them, their viral loads will likely be suppressed, indicating that they are being properly treated and that they are responsive to the treatment. Nurses play the critical role of assessing and documenting viral loads to determine whether patients are progressing appropriately along their plans of care. As such, testing viral loads and documentation per the guidelines (at least once every 12 months) and making sure these viral loads are suppressed are extremely important to effective HIV treatment. Nurses also play critical roles in educating patients on medication adherence and ensuring patients are compliant on their medications. Therefore, nurses hold responsibilities related to both the documentation

and suppression of patients' viral loads. Viral load suppression depends on patients' viral loads being documented. VLD and VLS are also two key indicators of successful HIV treatment.

Nurses in Namibia also play an important role in helping Namibia achieve the 90-90-90 goals. In 2015, with the goal of decentralizing HIV services from centrally located hospitals to the primary care health centers and clinics closer to where Namibians reside, IntraHealth and the Namibian MoHSS began training nurses to manage the care of HIV patients. The training program, Nurse Initiated Management of ART Medications (NIMART), was introduced in 2015. NIMART training involves two days of theoretical learning and classroom demonstration, followed by two days of clinic visits where nurses care for HIV patients and initiate ART under supervision. There is also a written test following the last day of training. After nurses complete the training, mentors will check on and supervise them as they initiate 20 patient visits on ART (Mdala et al., 2018).

The training began in September 2015, and through a slow process many nurses across districts were trained. The decentralization of nurses' initiation on ART and HIV services shifted to health centers and clinics, in addition to hospitals. NIMART training allows nurses to provide care in less centrally located areas, thereby improving access to quality HIV services to people across Namibia and allowing patients to access services at health centers and clinics closer to where they live. The tasks of prescribing HIV medications and managing the care of HIV patients in effect shifts and decentralizes care from physicians to nurses, making nurses a particularly important part of HIV care and services in Namibia.

It is important to note that in Namibia there are two types of nurses. The first are those who are labeled as "enrolled nurses" (EN). These nurses have two years of training that culminate in a certificate, which allows them to register as enrolled nurses with the Health

Professional Council Namibia (HPCNA) (Republic of Namibia, 2004). The other type of nurses are RNs, who must complete an accredited nursing school program to receive a diploma or degree in nursing. After graduation, these nurses are eligible to register with the HPCNA as RNs (Republic of Namibia, 2004). Nurses of either type need to be adequately staffed at all types of health facilities to provide high-quality care to those people living with HIV and to achieve suppressed viral loads for those living with HIV.

Despite NIMART training, there remains a shortage and maldistribution of nurses across Namibia, which means that hospitals, health centers, and clinics are staffed differently, with some being understaffed. Because nursing is so vital to the delivery of HIV care and services, nurse staffing is very important to ensure provision of quality HIV services. Previous nurse staffing research has established a connection between stronger nurse staffing and better chronic disease management outcomes in outpatient settings (Griffiths et al., 2011; Lukewich et al., 2016). However, the relationship between nurse staffing and HIV outcomes in Namibia has not been studied yet.

The purpose of this study was to explore relationships between nurse staffing at Namibian hospitals, health centers, and clinics in areas with high HIV burden and HIV-related organizational outcomes, specifically VLD and VLS, which are indicators of successful ART treatment. This chapter describes a secondary data analysis that explored the relationship between nurse staffing and VLD and VLS in Namibian outpatient HIV services provided at hospitals, health centers, and clinics in regions with high HIV burden. The discussion section presents insights on how the results of this analysis can contribute to a broader understanding of the relationships between nurse staffing and patient outcomes.

Relevant Literature

There is considerable existing research on the relationship between nurse staffing and a variety of different organizational outcomes. The following sections will define nurse staffing, briefly review common measures of nurse staffing, and examine the relationship between nurse staffing and organizational outcomes in inpatient, general long-term care, and outpatient settings, and, lastly, highlight variables other than nurse staffing that may affect organizational outcomes.

Nurse Staffing

The International Council of Nurses defines safe nurse staffing as having an appropriate number of nurses available at all times, of a suitable educational mix, to meet patient care needs and deliver quality care (ICN, 2018b). Important considerations in nurse staffing research are how to consistently determine the number of nurses needed and how to measure nurse staffing. Common measures of nurse staffing typically used in prior research on inpatient nurse staffing include the number of nurse full-time equivalents (FTE), number of nurse hours per patient day (HPPD), the proportion of registered nurses to total staff (percent RNs), registered nurse skill mix (i.e., the education or credentials of RN staff), and nurse-to-patient ratios (Spetz, Donaldson, Aydin, & Brown, 2008). Another common measure of nurse staffing is nurse-perceived staffing adequacy. Definitions of these different nurse staffing measures are provided in Appendix G.

While the measures described above have been used mainly to make staffing decisions and measure nurse staffing in published research (Spetz et al., 2008), the WHO (WHO, 2010) developed a tool to estimate the workforce needed, according to evidence, about workload called the workload indicator of staffing needs (WISN). This is a tool used to make staffing decisions.

The WISN is a human resource management tool that can be used to determine staffing needs based on the workload of health workers at a particular facility. The WISN helps

determine workload by assessing the time it takes for health workers to do key tasks for their jobs (WHO, 2010). In Namibia, the WISN is currently used for budgeting, distributing health workers, and estimating needs for staff nurses and other health professionals. However, no prior peer reviewed research has used the WISN to examine the relationship between nurse staffing, as measured by the WISN, and patient or organizational outcomes. This dissertation project adds to the larger field of nursing research by evaluating how nurse staffing measured by the WISN method relates to organizational outcomes. More information about the WISN can be found in the Appendix H, *Steps used to Calculate WISN Differences and WISN Ratios.*

Outpatient Nurse Staffing and Organizational Outcomes

No reviews or other types of reviews were found that attempted to synthesize the literature on outpatient nurse staffing; in fact, only two studies examined the relationship between outpatient nurse staffing and organizational outcomes of any kind. However, studies examining the impact of various nurse-staffing approaches in outpatient settings have been reported. Across all measures, nurse staffing has been associated with chronic disease management (Jackson et al., 2011; Lukewich et al., 2016), quality of care (Barber et al., 2007; Lamkin et al., 2001; Lamkin, Rosiak, Buerhaus, Mallory, & Williams, 2002b), and patient satisfaction (Graveley & Littlefield, 1992; Vortherms, Spoden, & Wilcken, 2015).

Higher numbers of both RNs and NPs in primary care practices have been reported to be associated with more effective chronic disease management. Canadian primary care practices with at least one RN, in contrast to those with no RNs, were more likely to have patients with greater likelihoods of controlled blood pressure, lower low-density lipoprotein cholesterol, lower HbA1c, and controlled fasting blood glucose (Lukewich et al., 2016). Therefore, higher number levels of NPs and RNs in primary care practices were associated with better chronic disease

management. Nurse staffing was also associated with quality of care. In a cross-sectional survey conducted in Indonesia, increasing the number of RNs at public health facilities was associated with increases in quality of care (Barber et al., 2007). Lastly, nurse staffing was associated with patient satisfaction. One study of 7,061 patients in Canadian primary care facilities measured the number of NP FTEs in relation to patient satisfaction. The results reported increased numbers of NP FTEs were associated with increased patient satisfaction (Ammi et al., 2017). These studies all indicate that nurse staffing is positively associated with several different organizational outcomes.

Other Factors Important to Patient Outcomes

In research that examined the relationship between nurse staffing and patient outcomes, several other factors were often considered that may also affect patient outcomes. For example, in a study by Okunji et al. (2015) that examined HIV outcomes in inpatient services, several organizational factors were included in their analysis, including teaching status of hospital, public versus private hospital, urban versus rural hospital, region of hospital, size of hospital, and skill mix of nurses (Okunji, Daniel, Frough, & Hill, 2015). Aiken et al. (1999) examined the relationship between nurse staffing and inpatient HIV service outcomes. The authors also considered the availability of an attending physician on AIDS specialty services, and they explored nurses' control over their practice environment, the hospital unit and type where they worked (i.e., magnet hospital status, dedicated AIDS unit etc.), and a number of unit-level patient characteristic, such as sex, age, race, type of insurance, HIV risk categories, and illness severity (Aiken et al., 1999). These variables being related to HIV outcomes is important to consider in nurse staffing research, especially nurse staffing research related to HIV outcomes.

In a study of nurse staffing in two primary care settings, Griffiths et al. (2010) examined the relationship between nurse staffing and COPD, between diabetes and asthma admissions, and among accounted for geographical area of the facility's population density, income area of facility, skills and training of health workers, population of clients over 65 years of age, and population of clients of ethnic minority (Griffiths, T. Murrells, D. Dawoud, & S. Jones, 2010). Their results indicated these are other factors that could be influential of patient outcomes in outpatient settings. A Canadian study that examined nurse staffing and diabetes management in primary care accounted only for patient characteristics, such as patients' age, sex, and number of comorbid conditions, in its modeling, and it did not control for any facility factors (Lukewich et al., 2016), again indicating which covariates are important when considering predictors for chronic disease management in outpatient settings.

The literature highlights several important factors that are important in understanding the relationship between nurse staffing and patient outcomes, such as trainings of staff members (Griffiths et al., 2010), facility type (Aiken et al., 1999), geographical characteristics surrounding the facility (i.e., rural versus urban, population characteristics of surround area) (Griffiths, Murrells, Dawoud, & Jones, 2010; Okunji et al., 2015), and skill mix of nurses (Okunji et al., 2015). No outpatient studies looked at the HIV outcomes or acuity levels of patients. Similar factors were considered, when feasible, for this study as predictors of VLD and VLS in order to control for variables other than nurse staffing that may predict VLD and VLS.

Theoretical Approach

The JD-R provides the theoretical grounding for this analysis. The JD-R suggests there are relationships among job demands, jobs resources, worker engagement, and worker burnout, which, in turn, are postulated to affect job performance and organizational outcomes (Bakker &

Demerouti, 2007). This model was developed in 2001 to explain the relationship between job conditions (i.e., job resources/ demands) and burnout (Demerouti et al., 2001). It was later applied to understand the relationships between these constructs and organizational outcomes (Bakker & Demerouti, 2007, 2017).

Job demands are various physical, psychological, social, and organizational factors that impede individuals from achieving work-related goals and, ultimately, organizational goals. *Job resources*, on the other hand, are physical, psychological, social, and organizational factors that help individuals achieve work-related and, ultimately, organizational goals (Bakker & Demerouti, 2007). To account for nurse staffing, which could be a job demand in low-staffing situations, or a job resource in high-staffing situations, this analysis considers these two concepts within the larger construct of job conditions/characteristics. *Organizational outcomes,* defined as the financial or service achievements of the organization, are also included in the JD-R (Bakker et al., 2004). In health care settings, service achievements include patient outcomes. Job demands are thought to worsen organizational outcomes, and job resources are theorized to improve organizational outcomes.

The JD-R assumes that all job conditions can be classified as either a job resource or a job demand (Bakker & Demerouti, 2017) and that these job attributes affect workers' attitudes, job performance, and organizational outcomes (Bakker & Demerouti, 2017). The focus of this study is on the relationship between nurse staffing and the HIV outcomes of VLD and VLS. Nurse staffing is defined as the having appropriate number of nurses available at all times, of a suitable educational mix, to meet patient care needs and deliver quality care (ICN, 2018b). As such, nurse staffing is a job condition/characteristic that could affect whether nurses complete their work. Nurse staffing levels may affect whether patients' viral loads are documented or

omitted, and, in turn, this task may also affect whether viral loads are suppressed. Therefore, the organizational outcomes that are of focus in this study are VLD and VLS. These organizational outcomes help achieve the overall goal of the organizations that provide HIV services and help facilitate the work of nurses in those organizations. This analysis therefore focuses on key areas of the JD-R to examine of the relationship between the job condition of nurse staffing and the organizational outcomes of VLD and VLS.

Methods

Study Design and Research Question

This study uses a secondary data analysis of quantitative data obtained from IntraHealth and MoHSS to address the following research question: What is the relationship between nurse staffing and HIV outcomes (VLD and VLS) in Namibian health facilities that provide care to HIV-positive clients? Nurse staffing was measured by the WISN. This study represents the quantitative component of a larger multiple-methods analysis of the relationships among nurse staffing, nurse attitudes, and organizational outcomes in Namibian HIV health facilities. The focus of this analysis is on nurse staffing and organizational outcomes, although nurse attitudes will be examined in chapter 4.

Setting and Sample

The sample for this analysis included 73 Namibian health facilities that participated in the USAID HIV Technical Assistance Project for HIV/AIDS (UTAP) implemented by IntraHealth International in Namibia. This project focused on addressing the needs of health care facilities located in Namibian districts with the highest HIV burden. These needs involved hiring and training nurses to manage the care of HIV patients and prescribing and managing ART medications. Namibia is comprised of 14 regions, each divided into smaller districts.

Table 3.1 describes the 73 facilities that participated in the IntraHealth project from which this study's sample was drawn. Each facility type, district, region, and the region's population are provided, along with the total number of people living with HIV in each region. The 73 facilities included in this study are comprised of 7 hospitals and 66 health centers and clinics. Overall, each facility type provides the same level of HIV services. However, some of the sickest patients are referred to hospitals if they are not responding to treatment or if they need in-patient hospitalization. Facilities vary in size and location, with clinics being the smallest facility type. Clinics are located in community centers and often, but not always, in less populated rural areas. Hospitals are the largest facility type and are located in more populated areas that are the administrative health centers of the district. An overview on the facilities and sample is shown in Table 3.1.

Table 3.1

Overview of Facilities and Sample

Region	Number of Hospitals Included	Number of health Center/ Clinics Included	Region Population (GeoHive, 2011)	Regional HIV Prevalence (CI) (Phia Project, 2017)	Viral Load Suppression Regional Prevalence (CI) (Phia Project, 2017)
Region 1	2	15	115, 447	14.5% (11.5, 17.4)	72.3% (64.0, 80.6)
Region 2	0	8	245,446	17.9% (16.0, 19.8)	86.2% (81.9, 90.4)
Region 3	1	18	243,166	16.9% (14.9, 18.9)	83.0% (77.7, 88.3)
Region 4	3	23	181,973	17.3% (13.9, 20.7)	79.7% (75.2, 84.3)
Region 5	1	1	143,903	8.5% (6.0, 11.0)	72.8% (67.1, 78.5)

Variables and Measurements

Key study variables (nurse staffing [ENs and RNs combined], and HIV outcomes) were measured using secondary data compiled from an electronic patient management system for

HIV/AIDS in the form of *IntraHealth Fiscal Year (FY)18 Annual Report to USAID* and *Implementing Mechanism/Annual Report*. Nurse staffing was measured using the WISN, and HIV outcomes were measured using the PEPFAR HIV measures of VLD and VLS. Table 3.2 outlines study variables, including the independent variable of nurse staffing, the dependent variables of VLD and VLS, and the covariates that will be used in this analysis. Each of these variables will be described below.

Table 3.2

Definitions of the Independent and Dependent Variables

Variable type	Variable Name	Operational Measure	Level of Measurement	Source of Data (Date Gather)
Independent	Nurse staffing	The WISN ratio measured as the current number of nurses available in a facility relative to the number of nurses needed. This measure calculated the workload requirement through secondary data available on the HIV services workload requirement and then added the FTEs needed to cover outpatient department visits to the HIV services estimate. My models will use both the continuous WISN ratio and a trichotomized version that will be categorized as insufficient (<0.75), sufficient (0.75-2.00) and overly sufficient (>2.0)	Continuous/ Ordinal	USAID HIV Clinical Services Technical Assistance Project (UTAP) HIV WISN Analysis for UTAP=Supported Sites & IntraHealth FY18 *Annual Report to USAID; Implementing Mechanism/ Annual Report*
Dependent	Viral load documentation	VLD is the number of ART patients (adult and pediatric) with viral load results documented in the medical record in the past 12 months, divided by the number of patients (adults and pediatric) on ART for at least 12 months.	Ratio	*IntraHealth FY18 Annual Report to USAID; Implementing Mechanism/ Annual Report*
Dependent	Viral load suppression	VLS is the number of ART patients with a suppressed Viral load results (<1000 copies/ml), as documented in the medical record and/or laboratory information system (LIS) in the past 12 months, divided by number of ART patients with viral load results documented in the medical record and/or LIS in the past 12 months.	Ratio	*IntraHealth FY18 Annual Report to USAID; Implementing Mechanism/ Annual Report*

Variable type	Variable Name	Operational Measure	Level of Measurement	Source of Data (Date Gather)
Covariate	Skill mix	Percent of registered nurses to total nursing staff (both registered nurses and enrolled nurses).	Continuous	Facility Records gathered on site
Covariate	NIMART	Dummy coded as 1 = At least 1 nurse at the facility participated in NIMART training; 0 = no nurses participated in NIMART training.	Categorical	Facility Records
Covariate	Facility type	Type of facility with two nominal levels represented as hospital or health center/clinic	Categorical	IntraHealth Records
Covariate	HIV burden of the region	Percentage of people living with HIV relative to the entire regional population	Continuous	Publicly available MoHSS Phia Project data (Phia Project, 2017)
Covariate	Patients visits	Total number of patients seen at a facility in a six-month period, regardless of uniqueness of patient.	Continuous	*IntraHealth FY18 Annual Report to USAID; Implementing Mechanism/ Annual Report*
Covariate	Gender	This measure of gender at the facility level was measured as the percentage of females with HIV infection currently receiving ART in 2018 out of the total number of people with HIV infections receiving ART in 2018.	Continuous	*IntraHealth FY18 Annual Report to USAID; Implementing Mechanism/ Annual Report*
Covariate	Age	This covariate is broken down into four variables. Each measures the percentage of individuals with HIV infection currently receiving ART in 2018 out of the total number of people with HIV infections receiving ART in 2018 at the facility in the following age categories: age 0-14, age 15-24, age 25-49 and age 50+.	Continuous	*IntraHealth FY18 Annual Report to USAID; Implementing Mechanism/ Annual Report*
Covariate	Severity of poverty	This covariate is defined as the percentage of households below the Namibian national poverty line, grouped into four intervals; 17.7-33.4%, 11.5-17.6%, 2.3-11.4%, 1.1-2.2%.	Interval	*Namibia Household Income and Expenditure Survey (NHIES) 2015/16 Report* (Namibian Statistics Agency, 2017)
Covariate	Average household consumption	This covariate is defined as the total household consumption, average household consumption of all goods, and the consumption per capita indicators presented in Namibia Dollars (NAD).	Continuous	*Namibia Household Income and Expenditure Survey (NHIES) 2015/16 Report* (Namibian Statistics Agency, 2017)
Covariate	Percent literate	This is the percent of literacy in each region. Literacy is defined as any person over the age of 15 who can read and write in any language with understanding.	Continuous	*Namibia Household Income and Expenditure Survey (NHIES) 2015/16 Report* (Namibian Statistics Agency, 2017)

Independent Variables

Nurse Staffing, the independent variable of interest, was measured using the WISN ratio. The WISN ratio was analyzed at two levels of measurement. It was analyzed, first, as the continuous WISN ratio and, second, as a trichotomized categorization of the WISN ratio into the following categories: insufficient staffing (<0.75), sufficient staffing (0.75-2.0), and overly sufficient staffing (>2.0). These numbers were determined based on consultation with an expert in the use of WISN. Both EN and RN nurses were included in the WISN ratio for this study. The WISN ratio was used to estimate the extent of nurse staffing need in a particular unit, department, or facility. My WISN ratio accounted for the workload of all HIV services at the facility and outpatient visits over a one-year period. A WISN ratio is comprised of current number of health care workers, in this case nurses, relative to needed number of health care workers and can be described as WISN ratio = current number of health care workers/needed number of health care workers derived from the calculated workload requirement.

WISN was designed to determine staff needs across all types of health workers; however, I narrow the use in this study to focus specifically on nurse staffing. The WISN ratio is calculated using data from observations, interviews, service statistics, and chart reviews to estimate the number of nurses needed to complete all relevant tasks in a facility. To estimate these numbers, the amount of time it takes each type of nurse to perform job-related tasks is determined through expert observational methods (WHO, 2010). The WISN data used in this analysis used expert opinion to determine the amount of time taken to perform specific activities, which was then validated in a time and motion study of direct nursing services. This analysis is done by creating activity standards for essential work for each type of health worker. Then an estimate of the number of activities that needed to be performed to meet essential patient-care

demands was calculated. The time that nurses take to carry out individual activities and the number of key activities that need to be performed to meet patient-care demands are used to calculate the number of full-time equivalent (FTE) nurses needed to meet demands.

To generate a WISN ratio, facilities enter all data needed to calculate the WISN ratios (e.g., the total FTEs of nurses available to work, the time it takes them to perform certain tasks, and frequency of performing certain tasks) into WISN Software, developed by WHO (WHO, 2010). Details about how the WISN is operationalized is described in the eight steps outlined in the WHO's *WISN User's Manual* (WHO, 2010), which is shown in Appendix H. Also, Appendix I demonstrates *How WISN Elements Interrelate*, as described in the 2010 *WISN User's Manual* (WHO, 2010).

There are two ways of stating the outputs of the WISN, both of which present the same results in a different format. The first is the *WISN difference*, or the current number of nurses minus the number of needed nurses (WHO, 2010). A negative number indicates how many more nurses are needed, whereas a positive number indicates how many extra nurses are currently employed. Although the WISN difference is helpful, the second usage of WISN output is the *WISN ratio*, as described above, or the ratio of current nurses divided by needed nurses. The inverse of the *WISN ratio* can be interpreted as the *workload pressure* that health workers face at work due to staffing. WISN ratio is thus another helpful interpretation developed through WISN data that provides a different assessment of staffing.

This analysis used the *WISN ratio* because it allows for better comparison of staffing between facilities of different sizes. For example, a facility that needs two nurses but is only deficient by one nurse has a bigger staffing deficit than a facility that needs 10 nurses but is deficient by only one nurse. Both facilities would have a WISN difference of -1, but the WISN

ratio for the first facility would be 0.5 (indicating severely understaffed, only meeting 50% of its staffing needs) and WISN ratio of 0.9 (indicating only slightly understaffed, meeting 90% of the staffing needs) for the second facility. Thus, in this analysis, a WISN ratio was more useful to accurately measure health facilities with short staffing.

To create a WISN ratio reflective of staffing levels for the facilities in Namibia, I used a WISN calculated requirement variable that focused specifically on the delivery of HIV services in Namibian facilities, a variable that IntraHealth calculated in 2018 by using HIV-service statistics. This calculation was used to estimate the number of nurses needed to provide HIV services specific to the workload needed to complete HIV related tasks. However, especially at smaller clinics, many nurses provide HIV services as well as other outpatient services, such as perinatal care or primary care. To better account for a WISN that reflects more than HIV services alone, an estimate of the workload needed for all outpatient visits for the entire year of 2018 was added to the HIV WISN that IntraHealth calculated. This approach better reflected the staffing needs of all health facilities. This nurse calculated requirement for outpatient visits was determined by multiplying the total number of patient visits to the facilities' outpatient departments in one year, with an estimated time of 30 minutes per outpatient visit. This calculated requirement was then added to the HIV services calculated requirement to create a needed number of nurses to meet workload demands. The current number of nurses was then divided by the needed number of nurses to create a WISN ratio reflective of the staffing levels needed to meet workload at each facility.

This analysis used the WISN definition of staffing sufficiency as a WISN score of 0.75 to 2.0. The *WISN User's Manual* states that the goal is to have the WISN ratio at exactly one (WHO, 2010); however, it is rare to have a WISN ratio of exactly one, so, for the purpose of this

analysis, I expanded the staffing sufficiency to be 0.75 to 2, an expansion based on expert consultation. The use of WISN is an appropriate measure of staffing, as it bases staffing numbers for each cadre on the actual workload needed to provide care at a particular facility.

Dependent Variables

The dependent variables used in this analysis are VLD and VLS. These variables are measured based on recommendations from the PEPFAR indicators, which come from a United States initiative to address the HIV/AIDS epidemic worldwide. PEPFAR lays out key indicators used to measure HIV/AIDS interventions to assess the success of HIV public health interventions and progress toward the 90-90-90 goals (PEPFAR, 2017). In this way, district- and community-level evaluations of HIV/AIDS services are standardized worldwide so that comparisons can be made.

VLD is defined as the number of ART patients (adult and pediatric) with viral load results documented in the medical record in the past 12 months, divided by the number of patients (adults and pediatric) on ART for at least twelve months (PEPFAR, 2017). In Namibia, VLD is considered appropriate if an adult on ART therapy within their first year on treatment has two viral loads documented or if an adult in any year after their first year on ART has one viral load documented (IntraHealth International, 2017). Pediatric patients (<age 15 years) continue to require two viral loads documented per year (IntraHealth International, 2017). Patients who died or who had been lost to follow-up were excluded from the denominator.

VLS is defined as the number of ART patients with suppressed viral load results (<1000 copies/ml), as documented in the medical record or laboratory information system (LIS) in the past 12 months, divided by the number of ART patients with viral load results documented in the medical record or LIS in the past 12 months (PEPFAR, 2017). A patient's viral load is

considered suppressed if it is below 1000 copies/ml, the standard measure of viral load assessment, as per PEPFAR guidelines. It should be noted that the denominator for VLS denotes how many patient viral loads were documented. Therefore, if there are high numbers of patients with undocumented viral loads, the total number of individuals with viral load suppression may be lower than the number reflected in the indicator. Limited viral load documentation causes potential bias in the results of VLS, and this bias is why VLD was also accounted for as its own outcome. Both VLD and VLS, reported annually, were required PEPFAR. In this analysis, data on these variables were collected in 2018. Again, patients who had died or who had been lost to follow-up were excluded from the count.

Covariates

Several other variables were used as covariates in this analysis. As shown in Table 3.2, the covariates used in this study were skill mix, nurse-initiated management of ART (NIMART) training, facility type, HIV burden, patients visit at a facility each year, gender at a facility level, age at a facility level, level of poverty in the region of the health facility, average household consumption in the region of the health facility, and literacy rate in the region of the health facility. Each of these is described in the following sections.

Skill Mix is calculated based on the number of RNs and ENs working at a facility. For this analysis, skill mix was measured as a percentage from the number of RNs out of the total number of ENs and RNs combined. Skill mix has been an important variable in previous nurse staffing research, with the ratio of RNs in staffing linked to several positive patient outcomes (Spetz et al., 2008). For this reason, skill mix was included as the second covariate of this analysis.

NIMART Training of Nurses is a dichotomous variable that indicates whether a facility had at least one nurse trained in NIMART. Exposure to NIMART training provides nurses with an education that enables them to provide care to Namibians living with HIV, and for this reason it was included as a control in this analysis. The training of health workers has been controlled for in previous nurse staffing outpatient research, as nurse training is likely to influence nurse-related patient outcomes (Griffiths et al., 2010).

Type of facility was also included as a covariate. Type of facility was assessed as either hospital or health center/clinic. Hospitals are typically the largest type of health facility and are found in more populated areas, whereas health centers/clinics are the smallest and found in less populated areas. Facilities included in the study thus vary in size and location. Because the variability in types of facilities may affect organizational outcomes, controlling for facility type is important. A dummy variable was created for each of these two types of facilities, with a reference group for hospitals. Type of facility has also been included in previous nurse staffing research on HIV services (Aiken et al., 1999). It should be noted at all facilities, including hospitals, provided HIV outpatient services; thus, even when hospitals are referenced, the focus is on the outpatient HIV services provided at that hospital.

The next covariate is the *HIV Burden*. All facilities included in this analysis are in regions in Namibia with high HIV burden. However, because the prevalence of the disease may vary from region to region, it is important to include this covariate. This variable was only available at a regional level; thus, in my analysis, the regional HIV-burden level that was used corresponded to each facility's location. Previous nurse staffing outpatient research highlighted the importance of controlling for important geographical characteristics in the region of a facility (Griffiths et al., 2010; Okunji et al., 2015).

The number of *patient visits* was included as a covariate because it reflects the amount or volume of work required in a facility over a six-month period. For the year of 2018, the number of outpatient visits made to a facility was measured as the actual number of visits made by all patients who seek care in the outpatient department of a facility over a six-month period. Data for an entire year was not available for this variable; complete data for this indicator was only available for a six-month period. Because this variable is a covariate, I chose to use data for the six-month period because it reflects the busyness of each facility in comparison to other facilities. This covariate did not account for patient uniqueness, meaning that a patient who came to the facility more than once were counted in this number more than once. Although previous nursing research focused on outpatient settings has not looked at the exact number of patients' visits in a facility, it is important to control for this number because facilities with more patient visits are likely to put a greater burden on the nursing staff and may therefore affect patient outcomes, as high workloads are correlated with more negative patient outcomes (Duffield et al., 2011).

Gender represented the percentage of female patients with HIV infections currently receiving ART in 2018 out of the total number of people with HIV infections receiving ART in 2018. This variable is particularly important because, in Namibia, females and males have different rates of viral load suppression; females have a prevalence of viral load suppression at 81.7% and males only 69.6% (Phia Project, 2018). Also, more females than males become patients.

Age was represented the percentage of patients cared for by age group at a facility. The age groups were defined as 0–14 years of age, 15–24 years of age, 25–49 years of age, and over 50 years of age. These age groups were made based on important age groups specific to

Namibia. In Namibia, patients who are younger than 15 years old are considered to be a pediatric patients. Those aged 15–24 have higher incidence rates of HIV (Phia Project, 2018). Lastly, older than 50 was chosen to reflect geriatric patients. Age is important to HIV outcomes because incidence rates vary by age groups (Phia Project, 2018). These four age groups were defined further as the percentage of individuals cared for at the facility in each age category.

The covariate of *poverty severity* was defined as the percentage of households below the Namibian national poverty line grouped into four intervals: 17.7–33.4%, 11.5–17.6%, 2.3–11.4%, 1.1–2.2% (Namibian Statistics Agency, 2017). These data were only available at a regional level. Each facility included in this analysis was located across five regions in Namibia. Therefore, each facility was matched with their regional-level poverty severity for this analysis. This severity was an indicator of the socioeconomic status of individuals in the region, which may contribute to social determinants of health (Wojcicki, 2005), and this indicator was therefore an important variable to control for in this analysis.

The covariate of *average household consumption* was defined as average household consumption of all goods in Namibia dollars (NAD) (Namibian Statistics Agency, 2017). This variable was also only available at a regional level, so, for this analysis, facilities were matched with the average household consumption for the region in which they are located. When used in the Poisson regression, individual region estimates were applied to each facility. This is an indicator of socioeconomic status of individuals in the region, which may contribute to social determinants of health (Wojcicki, 2005).

The covariate of *percent literate* was defined as the average rate of literacy. Percent literacy was defined as the percent of people out of the total population over the age of 15 that can read and write in any language with understanding. Again, only regional-level data was

available for this variable. Therefore, when used in the Poisson regression, individual region estimates were applied to each facility. This was an indicator of the socioeconomic status of individuals in the region, which may contribute to social determinants of health (Wawrzyniak, Ownby, McCoy, & Waldrop-Valverde, 2013; Wojcicki, 2005). Therefore, this indicator is an important covariate, as it may be an important predictor of our outcome variables.

Procedures

Existing WISN ratios and HIV outcomes for each facility were collected in 2018 by the Namibia MoHSS. These data were obtained by the principal investigator (PI) from the MoHSS through IntraHealth for use in this study. An agreement for the use of all data, based on IRB approval, was established between the UNC, MoHSS, and IntraHealth. After all the data were received, data were cleaned, new variables were constructed, and an analytic dataset was created. After the analytic dataset was complete, data analyses began.

Human Subjects

Prior to launching this study, approval was obtained through the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill (UNC), as well as the IRB at Namibian MoHSS. Submission of the IRB application for UNC occurred in May 2019, prior to any data access or data analysis. This analysis used secondary data collected originally by the MoHSS on health workers and on 2018 VLD and VLS for HIV patients treated in hospitals, health centers, and clinics in northern Namibia. Intrahealth accessed MoHSS data for their annual evaluations, and it shared relevant data for this project after my dissertation proposal defense and IRB approvals. These data currently resided on a secure server at IntraHealth offices. Before I received data, Intrahealth de-identified all organizational and personally identifying human subjects' information for all health facilities, health care workers, and patient

information. Thus, it was not possible for me to link any data to staff or patients. Although statistical experts working on this project resided in the United States, only de-identified data from Namibia were used.

This analysis was made possible through a longstanding partnership between the US-based University of North Carolina at Chapel Hill and IntraHealth. MoHSS was the original collector of all staffing and HIV data. IntraHealth collected facility-level data from MoHSS facilities for PEPFAR and MoHSS reporting purposes. IntraHealth's work in Namibia has been underway since 2006 in general and for the USAID funded HIV Clinical Services Technical Assistance Project, which seeks to enhance Namibian health workers' ability to deliver high-quality HIV services, since 2014 in particular. This dissertation complemented the evaluations conducted by IntraHealth. All Namibian procedures for taking data out of the country were respected and followed according to the IRB approval. No research from this data will be published until approved by the Namibian MoHSS and until a MoHSS co-author joins the publication team. There was no risk for individual patient harm or harm to the facility, as data are de-identified.

Analysis

This study used Poisson regression to explore the relationships between nurse staffing (independent variable) and VLD and VLS (dependent variables) at the facility level of analysis. This type of regression analysis allowed me to analyze the relationship between nurse-staffing data and important HIV outcomes at a facility level. This analysis was accomplished by estimating two separate sets of regression models, one set for each of the two dependent variables (VLD, VLS). I used Poisson regression to model the log of the expected values in

terms of the following predictors: WISN, skill mix, NIMART, HIV burden, gender, age, level of poverty, average household consumption, and percent literacy.

Power was computed using the Poisson regression procedure of PASS 11(Signorini, 1991), which was based on the following assumptions: predictors are standardized, all predictors other than staffing are at their observed means, a 5% significance level, and an estimated proportion of 0.50 VLD and VLS at the observed mean staffing. A sample size of 73 provided 80% power to identify an increase of about 58% (or an increase of 0.29 units to a viral suppression proportion of 0.79), with an increase of one standard deviation in nurse staffing, in VLD and VLS. Thus, this secondary analysis of existing data was powered by identifying only relatively large effect sizes.

Overview of Modeling

Modeling was conducted first by completing single predictor models; then, if the independent variable of interest (WISN) was significant in the single predictor models, by completing two predictor (i.e., WISN and a single covariate) models; and, last, if the independent variable of interest (WISN) remained significant in the two predictor models, by completing multiple predictor models (Gonzalez, Teran, Saiz-Urra, & Teijeira, 2008).

Specifically, in order to understand the relationship between all predictor variables individually and the outcome variables of VLD and VLS, single predictor models were generated first, one for each predictor variable. This process included the continuous WISN measure as well as the categorical WISN with levels insufficient staffing (<0.74), sufficient staffing (0.75-1.99), and overly sufficient staffing (>2), and with each of the covariates one at a time. If the WISN variable was not significant with one of the two outcomes (VLD or VLS), no more than two predictor models were considered for that outcome.

For cases with significant WISN measures, two predictor analyses were conducted as follows. A two-predictor model was generated with the WISN variable and with each covariate individually. These models were considered for both WISN variables (continuous and categorical) and, if the single predictor was significant, for each outcome variables (VLD and VLS).

If, after each of the covariates was controlled for, the WISN variable remained significant, a multiple predictor model was generated that included the WISN measure and all significant covariates from the associated single predictor models. Finally, scatter plots for each of VLD and VLS in terms of continuous WISN were generated to visualize the relationship between WISN and these two outcomes.

Results

The following section will describe results from my analyses, including descriptive statistics of the health facilities, selected predictor variables, and Poisson regression results for each model. The Poisson regression results include the single predictor model, two predictor model, and the multiple predictor model. Table 3.3 shows which models were generated at each phase of modeling.

Table 3.3

Overview of Models Discussed

Outcome Measure	Independent Variable	Single Predictor Model	Two Predictor Model	Multiple Predictor Model
Viral load documentation	Continuous WISN	*	*	*
	Categorical WISN	*	*	*
Viral load suppression	Continuous	X	-	-
	Categorical WISN	*	X	-

* = WISN was significant at <0.05. For two predictor and multiple predictor models, this symbol implies that the WISN stayed significant for all covariates. Categorical WISN indicates that the F test for the model for the composite predictor was significant.
X = WISN was not significant at <0.05. For two predictor and multiple predictor models, this X implies that the WISN was insignificant for at least one covariate. Categorical WISN indicates that the F test for the model for the composite predictor was significant.
- = Model was not completed due to insignificance at an earlier phase of modeling.

Although data were available for 73 health facilities, only 66 facilities had patients on ART, including 59 health centers/clinics and 7 hospitals. Out of the entire sample, the mean WISN was 1.09, with 38.81% of facilities understaffed, 52.73% sufficiently staffed, and 7.46% overly sufficiently staffed. At 0.56, the mean WISN for hospitals was far lower compared to health centers/clinics, which were staffed at 1.15. Table 3.4 outlines descriptive statistics of all predictor variables for the full sample as well as for health centers/clinics and hospitals.

Table 3.4

Descriptive Statistics for Predictor Variables of Viral Load Suppression and Viral Load Documentation by Facility Type

	Full Sample N=66		Health Centers/Clinics N=59		Hospitals N = 7	
	% or Mean	Standard Deviation	% or Mean	Standard Deviation	% or Mean	Standard Deviation
WISN*	1.09	0.76	1.15	0.78	0.56	0.25

	Full Sample N=66		Health Centers/Clinics N=59		Hospitals N = 7	
	% or Mean	**Standard Deviation**	**% or Mean**	**Standard Deviation**	**% or Mean**	**Standard Deviation**
WISN categories*						
Insufficient (WISN<0.75)	38.81%	-	35.00%	-	71.43%	-
Sufficient (.75-2)	53.73%	-	56.67%	-	28.57%	-
Overly sufficient (>2)	7.46%	-	8.33%	-	0%	-
Skill mix*	0.55	0.25	0.52	0.24	0.80	0.20
NIMART						
No nurses are NIMART trained	0	-	0	-	0	-
At least one nurse is NIMART trained	100%	-	100%	-	100%	-
HIV burden	16.34	1.86	16.47	1.62	15.19	3.21
Patient visits*	5736.41	5253.86	4593.15	3129.47	15372.43	9120.34
Gender (proportion at facility)						
Female	0.69	0.05	0.69	0.04	0.65	0.05
Age (% at facility)						
0-14	6.83	3.14	6.95	3.24	5.86	1.93
15-24	10.06	2.89	10.27	2.88	8.34	2.49
25-49	61.81	7.38	61.31	7.46	65.98	5.38
50+	21.30	6.88	21.47	7.00	19.83	6.03
Level of poverty						
1.1-2.2%	0	-	0	-	0	-
2.3-11.4%	76.12%	-	76.67%	-	71.43%	-
11.5-17.6%	0	-	0	-	0	-

	Full Sample N=66		Health Centers/Clinics N=59		Hospitals N = 7	
	% or Mean	**Standard Deviation**	**% or Mean**	**Standard Deviation**	**% or Mean**	**Standard Deviation**
17.7-33.4%	23.88%	-	23.33%	-	28.57%	-
Average household consumption	80885.61	11614.62	80700.56	11557.24	82445.29	12925.14
Percent literate	84.12	3.70	84.23	3.67	83.24	4.11

**Indicates that this variable had significantly different means based on t or chi squared tests at the 0.05 significance level between facility types. For t tests, when the p-value for the F test for equal variances was >0.05, the pooled t-test was used, but otherwise the Satterthwaite t test was used.*

As for the organizational outcome variables, viral loads were documented in 67.39% of patients' charts according to age-related guidelines and to the timing of beginning ART. These results were not significantly different between health centers/clinics and hospitals. However, of those patients who had their viral load documented, 90.59% had a suppressed viral load, with 91.88% of females and 86.77% of males having suppressed viral loads. It should be noted that the denominator for VLS is the number of patient viral loads that were documented. Thus, VLS only reflects the viral load suppression of those patients for whom viral loads were documented. Similar to VLD, VLS was not significantly different between health centers/clinics and hospitals. Table 3.5 indicates the means of VLD and VLS across all health facilities and across centers/clinics and hospitals.

Table 3.5

Prevalence of Viral Load Documentation and Viral Load Suppression by Health Facility Type

	Full Sample N=66		**Health Centers/Clinics N = 66**		**Hospitals N = 7**	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**
Percent viral load documented out of total on ART	67.55	18.63	66.16	18.25	79.50	18.97
Female	68.36	19.75	66.90	19.42	80.79	19.57
Male	65.95	18.20	64.64	17.75	77.23	19.50
Percent viral load suppressed out of viral load documented	90.30	5.49	90.35	5.52	89.93	5.61
Female	91.88	5.31	92.02	5.39	90.72	4.82
Male	86.77	9.00	86.61	8.94	88.17	10.12

**Indicates that this variable had significantly different means based on t or chi squared tests at the 0.05 significance level between facility types. For t tests, when the p-value for the F test for equal variances was >0.05, the pooled t-test was used, but otherwise the Satterthwaite t test was used.*

Single Predictor Models for Viral Load Documentation

Using both the continuous and categorical WISN variables, this model predicted the outcome, VLD; both variables were significant predictors of VLD. Both WISN variables have positive estimates that indicate that, prior to controls for any variables, as WISN increases more viral loads on average have been documented. Other significant predictors of WISN included skill mix, HIV burden in the region of the facility, number of outpatient visits in a six-month period, all gender and age predictors, average household consumption in the region of the facility, and percent literate in the region of facility. The significant covariates indicate variables that will be included in the multiple predictor model. Table 3.6 gives an overview of the single predictor models for the VLD outcome.

Table 3.6

Single Predictor Regression Models for Viral Load Documentation Outcome

	Single Predictor			
Predictors	**Estimate**	**SE**	**95% CI**	**p-value**
WISN*	0.0342	0.0103	0.0140–0.0543	0.001
WISN categories (ref-sufficient staff)*				
Insufficient (WISN<0.75)	-0.0595	0.0110	-0.0810 – 0.0380	<.001
Overly sufficient (>2)	-0.1771	0.0521	-0.2792–0.0750	0.001
Skill mix (RN%)*	-0.1034	0.0245	-0.1514–0.0555	<.001
Facility type				
Health Center/Clinic	0.0172	0.0108	-0.0041–0.0384	0.114
HIV burden*	-0.0186	0.0026	-0.0236–0.0135	<.001
Patient visits*	0.0000	0.0000	0.0000–0.0000	<.001
Gender*				
Percent female	-2.1011	0.1245	-2.3451–1.8572	<.001
Age (% at facility)				
0–14*	-0.0055	0.0020	-0.0094–0.0016	0.006
15–24*	-0.0101	0.0025	-0.0150–0.0052	<.001
25–49*	0.0098	0.0010	0.0078–0.0117	<.001
50+*	-0.0074	0.0010	-0.0094–0.0054	<.001
Percent level of poverty (ref=2.3-11.3%)				
17.7–33.4%	0.0038	0.0175	-0.0306–0.0381	0.829
Average household consumption*	-0.0000	0.0000	-0.0000–0.0000	0.043
Percent literate*	-0.0063	0.0019	-0.0101–0.0025	0.001

****Indicates that the F test for the model was significant at the p<0.05.*

Single Predictor Models for Viral Load Suppression

In the single predictor model, the continuous measure of the WISN was not a significant predictor of VLS. This result indicates that no further analysis was needed on this variable, as it is not a significant predictor of VLS. However, the model of the categorical measure of the WISN was a significant predictor of VLS. Other significant predictors of VLS were skill mix

(percent of RNs out of total nurses), number of patient visits in a six-month period, percent of patients at the facility aged 0–14, percent of patients at the facility aged 15–24, percent of patients at the facility older than 50, percent of poverty in the region of the facility, average household consumption in the region of the facility, and percent literacy of the facility. Table 3.7 outlines the results of the single predictors models for the outcome of VLS. Because the continuous WISN variable was not significant as a single predictor in this model, no further modeling that used the continuous WISN variable as a predictor of VLS was conducted. Instead, only the categorical measure of WISN was used in modeling.

Table 3.7

Single Predictor Models for Regression for Viral Load Suppression

	Single Predictor			
Predictors	**Estimate**	**SE**	**95% CI**	**p-value**
WISN	-0.0183	0.0115	-0.0985–0.0043	0.113
WISN categories*				
Insufficient (WISN<0.75)	0.0348	0.0115	0.0122–0.0574	0.003
Overly sufficient (>2)	0.0378	0.0541	-0.0682–0.1438	0.485
Skill mix (RN%)*	-0.0831	0.0254	-0.1328–0.0334	0.001
Facility type				
Health center/clinic	-0.0017	0.0114	-0.0239–0.0206	0.883
HIV burden	-0.0034	0.0027	-0.0019–0.0087	0.207
Patient visits*	0.0000	0.0000	0.0000–0.0000	<0.001
Gender				
Percent female	-0.2235	0.1298	-0.4779–0.0309	0.085
Age				
0–14*	-0.0052	0.0021	-0.0092–0.0011	0.012
15–24*	-0.0120	0.0026	-0.0171–0.0070	<0.001
25–49	0.0002	0.0010	-0.0023–0.0018	0.823
50+*	0.0039	0.0011	0.0018–0.0060	<0.001
Percent level of poverty *				
17.7–33.4%	-0.0979	0.0191	-0.1353–0.0605	<0.001
Average household consumption *	0.0000	0.0000	0.0000–0.0000	<0.001
Percent literate*	0.0098	0.0021	0.0057–0.0140	<0.001

**Indicates that the modeled variable was significant at the p<0.05.*

WISN as a Predictor of Viral Load Documentation

Figure 3.1 depicts the relationship between WISN and VLD in a scatterplot for VLD in terms of continuous WISN. Only 3 out of 66 facilities (4.5%) achieved VLD at rates greater than 90%. In the two predictor models, the continuous WISN and the categorical WISN remained

significant ($p<0.05$) predictors of viral load documentation, with each covariate entered separately. Therefore, both WISN measures were used to generate multiple predictor models. The covariates included in the multiple predictor model were all significant predictors of WISN from the single predictor analysis, including skill mix (percent of RNs out of total nurses), HIV burden in the region of the clinic, number of patient visits in a six-month period, all gender and age predictors, average household consumption in the region of the facility, and percent literate in the region of the facility.

Figure 3.1

The Scatterplot of WISN and VLD

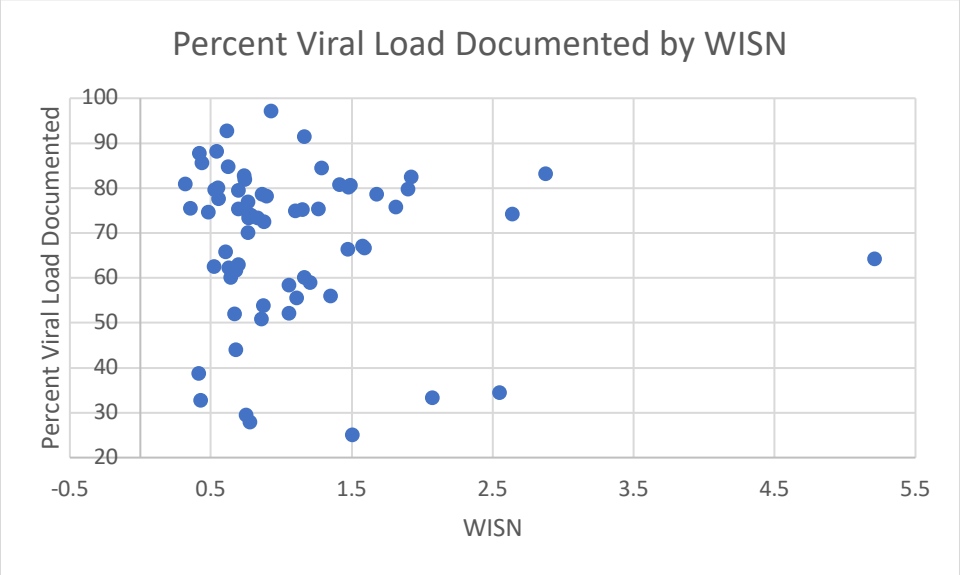


Table 3.8 shows the results of the continuous WISN variable. The estimated slope for WISN was 0.1345 (95% CI: 0.1090, 0.1600, $p<0.001$). This slope indicates, even after controls for all other significant covariates, that as WISN increased more patients' viral loads were documented on average. Another notable result from this analysis were the results from skill mix. Skill mix had an estimated slope of -0.3621 (95% CI: -0.4209, -0.0297, $p<0.01$), indicating

that higher percentages of RNs (skill mix) was associated with lower viral load documentation, and both variables are important in predicting viral load documentation.

Table 3.8

Multiple Predictor Model for Continuous WISN Predictor and Viral Load Documentation

	Single Predictor			
Predictors	**Estimate**	**SE**	**95% CI**	**p-value**
WISN*	0.1107	0.3381	0.0872-0.1342	<.001
Skill mix*	-0.3093	0.0280	-0.3641--0.2545	<.001
HIV burden*	-0.0332	0.0039	-0.0408--0.0256	<.001
Patient visits*	0.0000	0.0000	0.0000–0.0000	<.001
Gender*				
Percent female	-3.0680	0.1742	-3.4095–2.7266	<.001
Age				
0–14	0.0365	0.0028	0.0311–0.0419	<.001
15–24	0.0392	0.0036	0.0322–0.0463	<.001
25–49	0.0059	0.0014	0.0031–0.0087	<.001
50+	0.0000	0.0000	0.0000–0.0000	
Average household consumption *	-0.0000	0.0000	-0.0000–0.0000	0.0032
Percent literate	0.0037	0.0034	-0.0030–0.0104	0.2802

***Indicates that the f test for the model was significant at the p<0.05.*

Table 3.9 shows the impact of the categorical WISN measure on VLD, with a reference category of sufficient staffing. The f test for the model of the categorical WISN remained significant in this model. When I controlled for all significant covariates, the category of insufficient staffing was a significant predictor of VLD (estimate of -0.1346, 95%CI: -0.1675, -0.1018, p<0.001). However, the category of overly sufficient staffing did not predict VLD (estimate of 0.0125, 95% CI: -0.0915, 0.1166, p=0.813). These results indicate that, compared to

the reference category of sufficiently staffed, facilities in the category of insufficient staffing had poorer VLD; however, a WISN ratio greater than 1.5 did not improve documentation.

Table 3.9

Multiple Predictor Model for Categorical WISN Predictor and Viral Load Documentation

	Single Predictor			
Predictors	**Estimate**	**SE**	**95% CI**	**p-value**
WISN categories*				
Insufficient (WISN<0.75)	-0.1135	0.0156	-0.1441–0.0829	<.001
Overly sufficient (>2)	-0.0044	0.0529	-0.1080–0.0993	0.9341
Skill mix*	-0.3039	0.0281	-0.3590–0.2487	<.001
HIV burden*	-0.0268	0.0040	-0.0346–0.0190	<.001
Patient visits*	0.0000	0.0000	0.0000–0.0000	<.001
Gender				
Percent female*	-3.1869	0.1728	-3.5255–2.8483	<.001
Age				
0–14	0.0346	0.0028	0.0291–0.0401	<.001
15–24	0.0378	0.0037	0.0306–0.0450	<.001
25–49	0.0059	0.0014	0.0031–0.0087	<.001
50+	0.0000	0.0000	0.0000–0.0000	.
Average household consumption	0.0000	0.0000	-0.000–0.0000	0.736
Percent literate	0.0013	0.0039	-0.0057–0.0083	0.721

**Indicates that the F test for the model was significant at the p<0.05.*

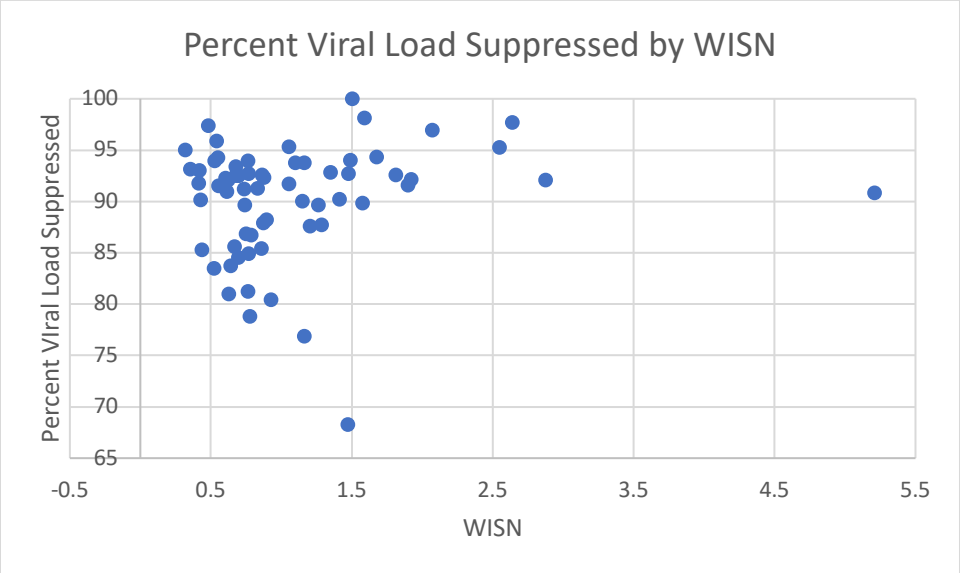
WISN as a Predictor of Viral Load Suppression

Figure 3.2 depicts the scatterplot for the relationship between WISN and VLS. Variability in VLS was high for low values of WISN and became narrower as WISN increased. But the variability was only consistently high for very high staffing levels of about 2.5 or greater. However, the goal of 90% VLS was achieved for many facilities, in this case 44 of the 66 (66.7%) facilities. Again, it should be noted that the denominator of the VLS is dependent on

VLD; thus, VLS is only reflective of the patients for whom viral loads were documented. For this reason, it is important to examine both VLD and VLS. In the single predictor analysis, the continuous WISN variable was not a significant predictor of VLS. Therefore, the continuous WISN variable was not included in two predictor or multiple predictor models. However, the categorical WISN variable was significant in the single model and was used in two predictor modeling. After certain covariates were included in two predictor models (i.e., the number of outpatient visits in a six-month period, percent of patients aged 0–14, percent of patients aged 15–24, and average household consumption in the region of the facility), the categorical WISN was not a significant predictor of VLS. Consequently, a multiple predictor model for this outcome was not generated. Therefore, the continuous WISN was not a predictor of VLS in a single predictor model, and the categorical WISN was no longer a predictor of VLS in the bivariate predictor models, so neither the continuous nor the categorical WISN variables are significant predictors of VLS at facilities in Namibia.

Figure 3.2

The Scatterplot of WISN and VLS



In summary, neither the continuous nor the categorical WISN variables were significant predictors of VLS after controlling for covariates. Table 3.10 presents the results of the two predictor models that examined the relationship between the categorical WISN measure and the outcome of VLS.

Table 3.10

Two Predictor Models with Independent Variable of Categorical WISN and Viral Load Suppression Outcome

	WISN Insufficiently Staffed				WISN Over sufficiently Staffed				Variable of Interest[2]			
	Estimate	**SE**	**95% CI**	**p-value**	**Estimate**	**SE**	**95% CI**	**p-value**	**Estimate**	**SE**	**95% CI**	**p-value**
Skill mix*	0.0353	0.0115	0.0127–0.0579	0.002	0.0469	0.0542	0.0542–0.1530	0.3872	-0.0847	0.0254	-0.1344–-0.0349	0.001
Facility type												
Health center/clinic*	0.0367	0.0120	0.0131–0.0602	0.002	0.0357	0.0542	-0.0706–0.1419	0.511	0.0066	0.0119	-0.0167–0.0299	0.580
HIV burden*	0.0358	0.0116	0.0132–0.0585	0.002	0.0356	0.0541	-0.0704–0.1417	0.510	0.0039	0.0027	-0.0014–0.0092	0.150
Patient visits	0.0223	0.0125	-0.0022–0.0467	0.074	0.0508	0.0543	-0.0556–0.1572	0.350	0.0000	0.0000	0.0000-0.0000	0.007
Gender												
Percent female*	0.0317	0.0121	0.0080–0.0554	0.009	0.0376	0.0541	-0.0684–0.1436	0.487	-0.1161	0.1365	-0.3636–0.1514	0.395
Age												
0–14	0.0274	0.0127	0.0025–0.0523	0.031	0.0354	0.0541	-0.0707–0.1414	0.513	-0.0031	0.0023	-0.0076–0.0013	0.170
15–24	0.0185	0.0123	-0.0056–0.0425	0.133	0.0266	0.0542	-0.0796–0.1327	0.635	-0.0106	0.0027	-0.0159–-0.0052	0.001

[2] Variable of Interest refers to the covariate on the left-hand column.

	WISN Insufficiently Staffed				WISN Over sufficiently Staffed				Variable of Interest[2]			
	Estimate	**SE**	**95% CI**	**p-value**	**Estimate**	**SE**	**95% CI**	**p-value**	**Estimate**	**SE**	**95% CI**	**p-value**
25–49*	0.0373	0.0118	0.0141–0.0605	0.002	0.0389	0.0541	-0.0671–0.1450	0.472	-0.0010	0.0011	-0.0031–0.0011	0.355
50+*	0.0298	0.0116	0.0070–0.0526	0.012	0.0355	0.0541	-0.0705–0.1415	0.512	0.0035	0.0011	0.0014–0.0057	0.001
Percent level of poverty												
17.7–33.4%*	0.0310	0.0116	0.0084–0.0537	0.007	0.0258	0.0541	-0.0803–0.1319	0.633	-0.0945	0.0191	-0.1320–0.0570	<0.001
Average household consumption	0.0181	0.0137	-0.0088–0.0450	0.187	0.0274	0.0543	-0.0790–0.1337	0.614	0.0000	0.0000	0.0000–0.0000	0.027
Percent literate*	0.0344	0.0115	0.0118–0.0570	0.003	0.0260	0.0541	-0.0801–0.1321	0.631	0.0098	0.0021	0.0056–0.0139	<0.001

**Indicates that the F test for the model was significant at the p<0.05.*

Discussion

The purpose of this study was to explore the relationships among nurse staffing in Namibian hospitals, health centers, and clinics in areas with high HIV burdens, and HIV-related organizational outcomes, specifically VLD and VLS. This paper innovatively used the WISN ratio in research as a measure of nurse staffing. Although widely used internationally, this tool has been used only to make staffing decisions; no prior nurse-staffing research was found in which WISN was used as the key measure of nurse staffing. This study's findings indicate that the WISN ratio is a significant predictor of VLD but not of VLS. The following sections examine the results and the meaning of this analysis in greater detail.

Impact of Nurse Staffing on Viral Load Documentation

After I controlled for all significant covariates, both the continuous and categorical WISN measures were significant predictors of VLD in all models. These findings indicate that as the WISN ratio increases, VLD also increases. Relating these findings to the JD-R, this analysis provides support for a positive relationship between the job resource of adequate nurse staffing and positive organizational outcomes (Bakker & Demerouti, 2007). These findings are also consistent with prior outpatient nurse-staffing research, which reported inverse relationships between nurse FTEs in primary care and hospital admission rates for patients with asthma ($p<0.001$) and COPD ($p<0.001$) (Griffiths, Murrells, Dawoud, Jones, et al., 2010) and positive relationships between RN FTEs and quality of care scores for patients with COPD, diabetes, and hypothyroidism (Griffiths et al., 2011). In addition, a study on outpatient nurse-staffing research indicated that facilities with lower ratios of diabetic patients to RNs had more patients with controlled hemoglobin A1c and fasting plasma glucose values than did practices with higher ratios of diabetic patients to RNs (Lukewich et al., 2016). The findings of this study therefore add to the body of knowledge about outpatient nurse staffing and further support prior research that indicated that adequate nurse-staffing levels are associated with positive organizational outcomes. This work further supports objective measures of adequate nurse staffing's relationship with positive patient outcomes. In addition, the WISN in this study represented both the HIV and outpatient department workloads. Future research could make two WISNs, one to represent HIV workload and one to represent outpatient workload, as doing so may provide more details on the relationships between nurse staffing (based on workload) and HIV outcomes.

It should be noted that only 4.5% of all facilities had viral loads documented in greater than 90% of the patients on ART medications. This percentage indicates that most facilities have

significant room to improve on this indicator, and it is therefore important to note that nurse staffing by the WISN is a predictor of VLD.

Impact of Nurse Staffing on Viral Load Suppression

Findings of this study indicate that continuous WISN was not a significant predictor of VLS, and when I controlled for all other variables, the categorical WISN was also not a significant predictor of VLS. However, for those interpreting these results, it should be noted that the denominator of VLS is the number of patients for whom viral loads were documented. The WISN had a significant relationship with VLD, even when I controlled for all other relevant variables. Staffing sufficiently by the WISN can aid in improving the documentation of patient viral loads and, in turn, VLS. Of the viral loads I documented, 44 of the 66 facilities had more than 90% of patient viral loads suppressed. By increasing VLD, the clinic could see additional patients, which may improve patient follow-up and compliance and improve VLS. It is logical to assume that, if more patients have their viral loads documented, more patients will also have documented suppressed viral loads. For this reason, sufficiently staffing by WISN may improve VLS, even though the variables are not significantly related in my model. Further research is needed to explore this possibility.

This finding, as conceptualized in this study, is therefore inconsistent with nurse staffing as a job demand or resource that would predict organizational outcomes (Bakker & Demerouti, 2007). My single predictor models indicated that certain covariates were nevertheless significant predictors of VLS: skill mix (i.e., percent RNs), number of patient visits in a six-month period, percent of patients at the facility aged 0–14, percent of patients at facility aged 15–24, percent of patients at facility older than 50, percent of poverty in the region of the facility, average household consumption in the region of the facility, and percent literacy by facility in the region.

It is especially important to note that the percentage of clients aged 15–24 at a facility was significantly related with VLS. Facilities with lower percentages of clients aged 15–24 had higher VLS. This finding is especially important to emphasize, because patients aged 15–24 have higher incidence rates of HIV (Phia Project, 2018); therefore, this age group is currently a population of interest in Namibia. Although I did not test a model specifically focused on this population, future research is needed to examine this patient population and better understand VLS in this population.

Another staffing-related measure, skill mix, was a significant predictor of VLS, whereas the WISN variable was not. More research will need to be done to determine what could have been causing the differences in significance between these variables. Future research also needs to be done to see if skill mix remains significant when controlling for other covariates.

The JD-R proposes that organizational outcomes, including patient outcomes such asVLS, should be associated with job conditions, such as nurse staffing. The larger problem, however, is the conceptualization of VLS as a nurse-sensitive outcome, or one that would be sensitive to nurse staffing. One could argue that VLS, albeit somewhat affected by nurses or nurse staffing, is an outcome measure that is highly dependent on patients' behaviors. The suppression of HIV load requires that patients adhere to their medication regime by consistently taking their medications as prescribed and that they retain their monthly follow-up appointments to check in with HIV clinicians to acquire their medications. It should be noted that some Namibian facilities have developed processes for making the retrieval of medications easier, such as creating fast-track options for individual patients or groups of patients, which rotates the retrieval of medications, but these options were not available at all facilities. Further research is

needed to understand the patient factors that impact VLS and to tease apart the facility and staffing factors (nurse staffing and for other health care workers) that might impact VLS.

Another factor that could affect VLS is medication stockouts in Namibia. If a facility experiences a medication stockout, the facility cannot acquire the medications from more centralized facilities or the Namibian government. Subsequently, patients are unable to receive their medications and unable to have the medicated blood levels needed to get suppress their viral loads. It is therefore quite plausible that, in Namibia, medication stockouts contributed in some way to patients' VLS in the facilities included in this study. Although I anticipated being able to control for medication stockouts in this analysis, data were not available. Therefore, further research is needed to understand the various predictors of VLS and to explain the impact of contextual factors—beyond the levels of the individual patient and facility—that might affect VLS in Namibians living with HIV.

Study Limitations

This research was limited by several factors. First, this research specifically sampled facilities that were a part of a larger IntraHealth intervention, which was specific to areas with high HIV burden. The narrow focus on these facilities could have biased my sampling, and it limits the generalizability of study findings to all Namibian public health facilities. In addition, the unit of analysis in this study was at the facility level. However, patient-level factors, such as age and gender, could be important predictors of VLS. This study accounted only for these factors aggregated to the facility level; however, individual data was not feasible to collect for this project. Finally, I was unable to access one variable of medication stockouts that is theoretically related to VLS. Medication stockouts would likely decrease VLS of patients, as it would make patients unable to remain adherent to their needed medications. Medication stockout

data were also not available at a facility, district, or regional level due to incomplete data, but stockouts are likely a contributor to VLS.

Next, it should be noted that the sample size turned out smaller than expected. While 73 facilities were the expected sample size, full data was only available for 66 of those facilities. This size means that there was even less power than was expected. This shortcoming could explain why some results, such as the relationship between WISN and VLS, were not significant.

Lastly, the JD-R, which guided this analysis, proposes that job attitudes mediate the relationship between job conditions and organizational outcomes (Bakker & Demerouti, 2007). However, there were no available quantitative data on nurses' job attitudes that could be included to examine this aspect of the model. Therefore, there was no way either to control for job attitudes as a predictor of VLD or VLS or to examine the mediating effect of job attitudes on the relationship between nurse staffing and the outcomes of VLD and VLS. However, a companion study presented in Chapter 4 of this dissertation presents the findings of qualitative interviews with Namibian nurses to understand how they described their job attitudes, the factors that shaped their job attitudes, and how their job attitudes contributed to their ability to do their jobs well. Further quantitative research is also needed to account for Namibian nurses' job attitudes and the possible mediating effect of job attitudes on the relationship between nurse staffing and organizational outcomes in outpatient settings.

Conclusions and Recommendations

Our results indicate that nurse staffing, operationalized through both continuous and categorical measures of WISN, was a significant predictor of VLD; however, nurse staffing was not a significant predictor of VLS. These results demonstrate that using the WISN to determine staff sufficiency could help improve VLD of patients on ART in Namibia. Only 4.5% of

facilities had VLDs documented at rates greater than 90%, and, therefore, there is room for improvement. My results also indicate that over-staffing does not have a significant relationship with findings, as there was no significant difference in the relationship between nurse staffing and outcomes at a sufficient level of staffing versus an overly sufficient level. The findings of this study also suggest that VLS may not be sensitive to nurse staffing, and that VLS may be affected more by factors beyond nurses or nurse staffing. More research is needed to examine other factors that impact VLS. Future research should also consider patient-level data rather than data aggregated at the facility level. These data could account for patient and provider factors that might affect VLD and VLS, but this research would require multi-level modeling to adjust for possible intra-facility correlation.

CHAPTER 4 (PAPER 3): NAMIBIAN NURSES' ATTITUDES ABOUT THEIR JOBS

Job attitudes are defined as beliefs about, feelings toward, and attachment to one's job (Judge & Kammeyer-Mueller, 2012). Positive job attitudes are linked with improved task and creative performance, citizenship behavior, worker productivity, and organizational performance (Judge & Kammeyer-Mueller, 2012). Previous research has also highlighted the importance of nurses' attitudes in improving patient outcomes. Nurses' attitudes are impacted by their perceptions of multiple factors, including job satisfaction, organizational commitment, job engagement, work motivation, and job burnout. These attitudes may, in turn, affect nurses' job performance, an organization's ability to retain nurses, and patients' outcomes, including patients' satisfaction with care (Chu & Hsu, 2011; Keyko et al., 2016; Rahiman & Kodikal, 2017; Van Bogaert et al., 2017). This research on nurse attitudes emphasizes how positive nurse job attitudes are a major contributor in delivering high quality health care.

Namibia, a country in Sub-Saharan Africa, faces severe shortages of health workers, especially nurses, relative to the care delivery demands across different types of public health facilities (Titus, McQuide, & Bock, 2018). Namibian public health facilities include hospitals, health centers, and clinics. Namibian's nurse staffing issues are compounded by a high prevalence of HIV among the population, with approximately 12.6% of Namibia's population living with HIV, with some regions as high as 22.3% (Phia Project, 2017). Starting in 2015, Namibian nurses' role in HIV services grew substantially due to a program called the nurse-initiated management of ART, or NIMART. This initiative allowed both registered and enrolled nurses to prescribe and manage ART medications without physicians being present as long as

two criteria were met: the nurse completed the training, and experts observed follow-up patient visits in which nurses initiated ART. This training placed nurses as a key providers of HIV services in Namibia. The high workload on nurses in an area with high disease burden and lack of health workers theoretically places nurses at higher risk of having more negative job attitudes (Bakker & Demerouti, 2007). Since nurses are also key providers of HIV services and are at risk of negative job attitudes, it is especially important to study nurses' job attitudes in Namibia.

Few studies are available about Namibian nurses' attitudes about their jobs, and, for the few that have been published, the results have been mixed. In a 2013 study conducted in state hospitals in Windhoek, Rehoboth, and Okahandja, Namibian ENs and RNs reported high work engagement scores, as measured by the Utrecht work engagement scale (UWES), despite their high stress working conditions (Awuku, 2013). Another study examined Namibian nurses' motivation about their work and found that, of the nurses surveyed, 26% disagreed and 19% strongly disagreed with being motivated at work (Soilkki, Cassim, & Karodia, 2014). These studies suggest that Namibia nurses are stressed and may not be motivated at work. However, other studies suggest that nurses are engaged at work (Awuku, 2013). Taken together, these studies emphasize the important role that nurses' job attitudes potentially have in shaping the work environment and patients' care experiences.

The purpose of this qualitative study was to examine Namibian nurses' attitudes about their jobs. This study sought to better understand nurses' attitudes about their jobs by interviewing Namibian nurses. Specifically, using qualitative interviews, this study sought to

- describe Namibian nurses' attitudes toward their jobs,
- identify the factors that contribute to Namibian nurses' job attitudes, and
- examine how Namibian nurses' job attitudes affect their ability to do their jobs.

Theoretical Approach

The JD-R was used to guide the development of this study. This model suggests that the relationship between job resources, job demands, and organizational outcomes is mediated by employee job attitudes (Bakker & Demerouti, 2007). The main constructs of this theory are job demands, job resources, worker engagement, worker burnout, and organizational outcomes. Job demands and job resources are opposing constructs that reflect essential job conditions, including the physical, psychological, social, and organizational factors that affect an individual's ability to achieve work-related goals (Bakker & Demerouti, 2007). *Worker engagement* and *burnout* are conceptualized here as aspects of workers' job attitudes, which reflect individuals' beliefs about, feelings toward, and attachment to their jobs. *Outcomes* are defined as the workers' perceptions of their ability to do their jobs well.

This paper will focus on the relationship between job conditions, nurse attitudes, and job performance or outcomes in outpatient settings. This theory articulates the importance of understanding both the factors that shape nurses' job attitudes and the ways that these attitudes might affect nurses' work, particularly as these attitudes relate to organizational outcomes. A better understanding of the job attitudes of nurses working in Namibian health facilities can help identify ways that organizational leaders can address nurses' attitudes to maximize job performance in outpatient settings, which may lead to improvements in the care delivered to Namibians living with HIV.

Relevant Literature

Nurses' attitudes have been conceptualized in prior research as job satisfaction, organizational commitment, job engagement, work motivation, and burnout (Chu & Hsu, 2011; Keyko et al., 2016; Rahiman & Kodikal, 2017; Van Bogaert et al., 2017). To understand

previous research on nurses' job attitudes, this section explores the factors that contribute to nurses' perceptions of job attitudes and the impact of nurses' job attitudes on their ability to do their jobs.

Factors that Contribute to Nurses' Attitudes

Several studies highlight factors that predict the nurse attitudes listed. The job conditions that are also predictors of positive nurse attitudes in outpatient settings include higher nurse salaries (Alhyas et al., 2013; Chung-Park, 1998), positive relationships with clients (Alhyas et al., 2013; Ashley et al., 2018; Gardner & Walton, 2011; Pilpel & Naggan, 1988), positive relationships with colleagues (Ashley et al., 2018; Friese, 2012; Friese et al., 2016; Li et al., 2016), supportive management (Friese et al., 2016; Kamimura et al., 2012; Kaunonen et al., 2015), and lower workloads (Alenezi et al., 2018; Dugani et al., 2018; Edwards et al., 2018; Engelbrecht et al., 2008; Helfrich et al., 2017; Huengsberg et al., 1998; Rout, 2000). These studies indicate the importance of several job conditions in predicting job attitudes. In addition, a 27-article literature review also found that individual nurse personality traits, especially optimism, predicted the nurse attitude of job engagement (García-Sierra, Fernández-Castro, & Martínez-Zaragoza, 2016). This literature review also notes that several nurse characteristics are important in predicting job attitudes. Therefore, evidence from these studies on nurse attitudes supports the notion that job conditions and nurse characteristics together are important in predicting job attitudes.

Impact of Nurse Attitudes

Little research has been conducted on the outcomes associated with nurses' job attitudes in outpatient settings. The job attitudes of nurse job satisfaction and burnout are the only job attitudes studied in outpatient settings. Job satisfaction has been associated with the

organizational outcomes of decreased nurse turnover (Celentano, 1978; Delobelle et al., 2011; Lelli et al., 2015; Poghosyan et al., 2017) and decreased patient falls (Perry et al., 2018). Nurse burnout has been associated with nurses' desire to take sick leave (Plant & Coombes, 2003). These prior studies highlight the association between nurse attitudes and several outcomes of outpatient settings; however, this literature is limited by the size and scope of publications, a limitation that both makes it difficult to draw definitive conclusions and highlights a gap in the literature.

In inpatient settings, nurse burnout was reported to explain 52-62% of the variance in nurses' perceptions of quality of care and related job outcomes (i.e., infections, falls) (Van Bogaert et al., 2017). In a cross-sectional study of 2,084 Thai nurses, organizations with nurses who had higher emotional exhaustion scores were 2.63 times more likely to deliver poorer quality of care (Nantsupawat et al., 2016). Emotional exhaustion is one of three dimensions of burnout (the other two being depersonalization and lack of personal achievement) (Maslach & Jackson, 1981). While these results suggest an association between nurse attitudes and hospital or inpatient quality of care, the outpatient settings in which Namibian nurses work is quite different, which highlights an important gap in the literature about how to understand how nurses' job attitudes affects organizational outcomes.

Methods

This descriptive qualitative study used semi-structured interviews to gather data on the following three elements of the job attitudes of nurses working in Namibian outpatient settings: 1) nurses' description of their job attitudes, 2) the factors that nurses identify as contributing to their job attitudes, and 3) how nurses' job attitudes affect their ability to do their jobs well. A directed content analysis was conducted and used to analyze data (Hsieh & Shannon, 2005).

Directed content analysis allows qualitative texts, such as semi-structured interviews, to be analyzed in a systematic manner (Mayring, 2004). This technique focuses on the coding of semi-structured interviews to derive meaning from them (Mayring, 2004). The findings were structured in the context of the JD-R. Through this approach, nurses were asked to speak about their personal thoughts and feelings toward their jobs, with the intent of gaining a more meaningful interpretation of their descriptions of job attitudes.

Setting

The settings in which this qualitative work took place included 73 Namibian hospitals, health centers, and clinics. These 73 facilities participated in an intervention implemented by IntraHealth, an NGO, in Namibia. These facilities were located in the northeast and northwest parts of Namibia, the areas of Namibia with the highest HIV burden, as shown in Table 4.1. IntraHealth implemented its USAID-funded HIV clinical services technical assistance project (UTAP) in these 73 facilities. To complement other analyses included in this multiple methods dissertation, nurses were recruited for the qualitative interviews from these facilities.

The 73 facilities include 7 hospitals and 66 health centers or clinics, all of which provide outpatient HIV services. These facilities were located in northern Namibia, as only districts located in regions of high HIV burden received PEPFAR funding. Each type of facility provides the same level of HIV services; however, facilities vary in size and location. Clinics are the smallest type of facility and are located in less central and less populated areas of Namibia. Hospitals, the largest of the facility types, are located in more central areas.

Nurse Sampling

Study participants were purposefully recruited from the RNs and ENs working in one of the 73 facilities to represent the different types of facilities in these settings. While there is no

exact sample size that reflects an adequate or appropriate sample for qualitative interviews, the interview data were evaluated on an ongoing basis for adequacy and comprehensiveness of results to ensure saturation before ending data collection (Morse, 1995). Purposeful sampling helps ensure an adequate and appropriate sample that represents the population quicker so that data adequacy is attained (Morse, 1995). Through a purposeful sampling by geographic area, facility type, and nurse type (i.e., RN vs. EN), a desired sample size of 18 nurses was sought for the interviews (J. Morse, 2004).

Sampling was approached in several steps. First, the northeast versus northwest areas of Namibia were considered so that nurses were appropriately identified from different parts of the country and from the different types of Namibian health facilities of interest. In this way, the sample was contextualized to reflect both nurses living and working in areas of interest in Namibia and the facilities participating in UTAP. Table 4.1 indicates the districts that participated in IntraHealth's intervention. Because the northwest area included more districts than the northeast, nurses were sampled at a 2:1 ratio from the northwest to northeast areas.

Table 4.1

Namibian Districts in Each Area

Northeast	**Northwest**
Andara	Oshikuku
Nyangana	Onandjokwe
	Tsumeb
	Grootfonten
	Omuthyia
	Engala

The sample also reflected different types of facilities, namely hospitals and health centers/clinics. The distinctions between facility type were considered to account for differences in working conditions and nurse attitudes across these types of facilities. Health centers and clinics were combined into one category to avoid the risk of identifying the nurses interviewed because of the small sample size of nurses. Lastly, the sample was selected to reflect the nursing workforce in Namibia, specifically to include both RNs and ENs working in the selected Namibian facilities.

The goal of sampling was to invite two nurses working in each type of facility from the northeast and northwest areas and from each nurse type to participate in the study, as shown in Table 4.2. However, it was not always possible to recruit the desired two ENs and RNs from each facility, as both types of nurses may not have worked in the facilities on the interview day, which resulted in an actual sample of 11 RNs and 7 ENs for a total of 18 nurses.

Table 4.2

Sampling Strategy

	Registered Nurses	**Enrolled Nurses**
Northeast hospital	2	2
Northeast health center/clinics	4	4
Northwest hospital	1	1
Northwest health center/clinics	2	2
Total participants	*18 nurses*	

Data Collection

After IRB approval was obtained from all parties, the appropriate nurse managers in charge of the selected hospitals, health centers, and clinics shown in Table 4.2 were contacted to seek their help in informing all nurses about the study prior to contact. The PI confidentially approached eligible nurses in person to invite them to participate. Nurses were eligible to participate if they were ENs or RNs working in HIV services or ART clinics at facilities that used IntraHealth's interventions. All participation by facility and individual nurses was completely voluntary and confidential. The goal was to recruit even numbers of ENs and RNs. If multiple eligible nurses were willing to participate at any facility, nurses were chosen to evenly sample ENs and RNs, although at times neither an RN nor an EN was available for interview.

Nurses who agreed to participate were interviewed in person in the facilities where they worked. All interviews were conducted in English, as English is the national language spoken in Namibia and in all its health facilities. Interviews were recorded and saved on a secure password protected server at UNC. They were downloaded, transcribed, and, ultimately, deleted from the server after transcription was completed and data review and analysis had begun. Data collection continued until no new themes or codes were identified.

All nurses consented prior to beginning the interview (Appendix J). To preserve anonymity, consent was done verbally, which avoided a written record of nurses' names. Nurses were given a hard copy of the consent form found in Appendix J. Demographic data were gathered through a form (see Appendix K) to be able to describe the sample and relate findings to other relevant settings, if appropriate (Lincoln & Guba, 1985; J. M. Morse, 2015). A semi-structured interview (Appendix L) was used to allow content to emerge rather than to project theory onto a particular situation (Hsieh & Shannon, 2005).

The interview guide was designed to include open-ended questions that were important but not leading questions that would prompt participants to provide specific answers. This approach allowed nurses to describe their own feelings, perceptions, and cognitive responses about their jobs, and it allowed them to shape the direction of the interview based on their own personal experiences and evaluations of their work. The interview guide drew on prior literature and was developed to align with study aims and aspects of the JD-R. A specific interview question asked how NIMART training shaped nurses' work and attitudes toward their work.

Before the interview guide was finalized, two pilot interviews with two Namibian nurses at an HIV services clinic were conducted to refine the interview guide. After the pilot interviews were reviewed, it was determined that no revisions were needed to the interview guide. These interviews were not included in the final sample of nurses. The final interview guide was reviewed and approved by a panel of experts with expertise in research, qualitative methods, and global health research.

Upon completion of consent procedures, interviews lasted approximately 45 minutes each. The project PI traveled to Namibia and conducted all interviews in person and in secluded, confidential areas in the facilities where the nurses worked.

Research Ethics

Before the study began, approvals were obtained from the Institutional Review Board (IRB) at UNC and at the Namibian MoHSS. All health facilities, nurses, and patient identities remained confidential. The risks associated with this research were anticipated to be minimal. One potential risk was that other staff members may have known who was being interviewed; however, they would not be able to match who may have said what in the final presentation of data, meaning their actions therefore posed a minimal risk. Additionally, all interview recordings

and data were stored on a secure password protected server at UNC, confidential data were de-identified upon transcription, and auto recordings were deleted post transcription. All identifiable information (e.g., clinic names) were coded as a number, and the key was kept in a location separate from interview transcripts. Voluntary verbal consent was obtained from each participant prior to conducting interviews. The primary data collected through this qualitative study had to be taken out of Namibia, but confidentiality of all subjects was maintained, and all procedures required by the Namibian MoHSS regarding data collected in the country were respected and followed.

Analysis

First, demographic data (Appendix K) from all nurse interviewees were analyzed using descriptive statistics as factors in the reporting of results and interpretation of findings. Demographic data were gathered to ensure that results were transferable to settings other than those specific to Namibia (Lincoln & Guba, 1985; J. M. Morse, 2015).

Audio recordings of each interview were transcribed and reviewed by the PI to verify accuracy (Hsieh & Shannon, 2005). The transcripts were de-identified at the point of original transcription so that identifiable information was omitted for facilities and participants. Numeric codes were generated and used to represent all facilities and participates. The code sheet was locked in a separate location from the transcripts. The interviews were analyzed through directed content analysis, which involved developing categories that represent interview text with similar meanings and allowed the categories and the naming of categories to be derived from data (Hsieh & Shannon, 2005).

Data files were uploaded and analyzed using Atlas.ti software as a first step in categorizing data. Categorized data were then coded, as guided by the research questions and

research aims of this study, which are informed by the JD-R. A codebook was created based on the definitions from the JD-R for job conditions, job attitudes and organizational outcomes. However, in order to better reflect the research aims of this project, job conditions were coded as job factors. Codes were also created inductively to allow for additional codes to emerge from the qualitative data. In attempts to answer research question 2, factors that contributed to job attitudes, it was clear that other factors contributed to nurses' job attitudes beyond positive and negative job factors. However, an additional inductive code of other personal factors that contributed to job attitudes was identified. Table 4.3 shows a table of the codebook and definitions based on the JD-R.

Two coders, the PI and another coder, analyzed data to ensure confirmability that findings are shaped by participants and not by the bias of the researchers. The secondary coder was a doctoral student at UNC School of Nursing who had training in qualitative methods. A qualitative expert also followed the coding process to ensure consistency and rigor. To begin, each coder read the transcripts thoroughly and repeatedly to become immersed in the data (Hsieh & Shannon, 2005). Using Atlas.ti, the coders first coded independently and then together to reach a consensus on the codes (Baxter & Jack, 2008). Codes were sorted into themes to achieve meaningful interpretation of codes (Hsieh & Shannon, 2005; Mayring, 2004). Transcription quotations were then sorted into codes, which were used to develop themes for each code.

Table 4.3

Codebook Aligning Research Aims with the JD-R

Research Aim	Code	Description
Nurses' description of their job attitudes	Positive job attitudes	Positive job attitudes are an employee's engagement, energy, and satisfaction that arise from their work (Bakker & Demerouti, 2007) and a positive state of vigor, dedication, and absorption about one's job (Bakker et al., 2014).
	Negative job attitudes	Negative job attitudes are defined as job-related anxiety, exhaustion, and dissatisfaction that arise from one's job (Bakker & Demerouti, 2007).
Factors that contribute to nurses' job attitudes	Job factors	Job factors are both job resources and job demands. *Resources* are physical, psychological, social, and organizational aspects of their jobs that help individuals do their work and achieve work-related goals. *Demands* are various physical, psychological, social, organizational aspects of jobs that help individuals do their work and achieve work-related goals (Bakker & Demerouti, 2007)
	Personal factors	Any other personal factor (i.e., not a job resource or demand) that nurses describe as having an impact on their job attitudes. An example of a personal factor may be nurses' faith in God, which keeps them motivated through busy days at work.
How nurses' job attitudes shape nurses' perceptions of job performance and their ability to do their jobs well	Outcomes	Because this project focuses on nurses' attitudes that shape their job performance, outcomes represents nurses' perceptions of job performance and their perceptions of their ability to do their jobs well.

Next, after all codes and themes were clearly defined, relationships between codes were noted (Hsieh & Shannon, 2005). Relationships were determined based on the words of the participants, as nurses described what factors contribute to their job attitudes and how these attitudes impact of their job attitudes on their work. At each stage of data analysis, the two coders met to resolve any conflicts that occurred about codes, themes, or relationships. If consensus was not achieved, a third coder would have been asked to read the transcripts to assist in the final decision (Baxter & Jack, 2008); however, the two coders were able to reach consensus. To ensure dependability, an audit trail of all work was saved, including raw data, data synthesis, and process notes (Lincoln & Guba, 1985).

Results

Table 4.4 summarizes demographic results from the descriptive analysis of the final sample of 18 nurses. Due to availability, the final sample included 61.1% RNs (N=11) and 38.9% ENs (N=7). Although we did not achieve the original sampling goal of 50% RNs and 50% ENs, the results capture, as best as possible, the voices of both RNs and ENs at Namibian health facilities. Notably, 50% (N=9) of all nurses had only completed their nursing education within the last three years, and 44.4% (N=5) of nurses had less than one-year of experience at their current facility. The majority of nurses (72.2%, n=13) had received NIMART training.

Table 4.4

Description of Nurse Sample

Demographic Information	% of Nurses
Gender	
Female	66.7% (n=12)
Male	33.3% (n=6)
Nursing licensure	
RN	61.1% (n=11)
EN	38.9% (n=7)
University attendance	
Attended university	55.6% (n=10)
Did not attend university	44.4% (n=8)
Health Professional Council of Namibia registration	
Registered	100% (n=18)
Not registered	0 (n=0)
Facility type	
Hospital	33.3% (n=6)
Health center/clinic	66.7% (n=12)
Area of Namibia	
Northeast	33.3% (n=6)

Demographic Information	% of Nurses
Northwest	66.6% (n=12)
NIMART Trained	
Yes	72.2% (n=13)
No	27.8 (n=5)
Year in which completed nursing education	
2016–2019	50% (n=9)
2010–2015	22.2% (n=4)
Before 2010	27.8% (n=5)
Years of nursing experience	
≤1	22.2% (n=4)
2–5	27.8% (n=5)
6–10	33.3% (n=6)
>10	16.7% (n= 3)
Years at current facility	
≤1	44.4% (n=8)
2–4	38.9% (n=7)
5–7	16.7% (n=3)

Overview of Codes and Definitions

The interviews were coded by the relevant constructs of the JD-R described in Table 4.3, which were positive job attitudes, negative job attitudes, job factors (job demands and resources), personal factors, and outcomes. The constructs of the JD-R were aligned with the three research aims, each of which guide the presentation of the results: 1) nurses' description of job attitudes, 2) factors that contribute to nurses' job attitudes, and 3) how nurses' job attitudes shape nurses' perceptions of job performance and, specifically, how well nurses were able to perform their jobs.

Nurses' Descriptions of Their Job Attitudes

Nurses identified both positive and negative job attitudes that they experienced at work. This section explores the themes related to both positive and negative job attitudes to understand how nurses described their attitudes toward their job.

Positive Job Attitudes

Nurse' perceptions of positive job attitudes were categorized into the following themes: motivation, satisfaction, pride, and empowerment. Each of these will be described in the sections that follow.

Motivation. Motivation was expressed as nurses' feelings of desire or willingness to do their jobs. The vast majority of nurses (n=17, 94%) described feelings of motivation related to their work. Nurses described motivation as engagement, encouragement, and inspiration at work. They described having a desire to improve aspects of their work, to do a better job next time with their patients, and to go above and beyond at work. One nurse described motivation as keeping them up all night thinking about how to help their patient:

> It makes me motivated and inspired… because I was not sleeping, so I ha[d] to make follow up, by all means, that I reach [out to] all my mentors to explain this case because the viral load of this person was…going very high. So, I was keeping in my mind that I must not lose this innocent soul, but then instead we need to try to help. (Participant 4, RN, 2-5 Years of Nursing Experience)

Satisfaction. Satisfaction was expressed as nurses' feelings of fulfillment and enjoyment at work. Again, almost all nurses (n=17, 94%) reported feeling satisfied with one or more elements of their jobs, including their love for and interest in their work. Many nurses expressed liking or loving several aspects of their jobs, such as working with patients, helping people, and

learning new things about HIV throughout their entire careers. They described their jobs with words like enjoyment, happiness, love, and interest. The quotation below was expressed by a nurse describing all the reasons for loving nursing:

> My work as a nurse, actually it's a great job so to say. I like saving people, saving life and also to make sure that I render quality services to the community, and listen to the patients as they come to the clinic, giving their problems, and attend to those problem as accordingly. (Participant 6, RN, 6-10 Years of Nursing Experience)

Pride. Pride was expressed as nurses' feelings of pride or achievement within their own accomplishments. Most nurses (n=16, 89%) described feelings of pride about their work. This was a feeling they experienced after a specific accomplishment at work, such as handling a very challenging patient case. Nurses also described community recognition and respect about the status of the profession of nursing as sources of pride in their work. One nurse described feelings of pride at work when they were able to successfully deal with challenges:

> But then I feel more accomplished when I feel like I have faced one challenging thing that I've never experienced before, and then I managed to find a solution to that problem at the end of the day. Be it that I send that patient [to another level of care?] and then confirm [with] the other level that they received this case and it's in good hands, I feel very proud. (Participant 4, RN, 2-5 Years of Nursing Experience)

Empowerment. Empowerment was exemplified as nurses' feelings of strength and confidence in their ability to carry out their work. Thirty three percent (n=7) of all nurses interviewed mentioned empowerment as a job attitude they experienced. Empowerment

manifested as their feelings of competence, confidence, and ability to do their jobs. Nurses described feeling empowered when they felt equipped to do their jobs well. One nurse described their feelings of empowerment as the confidence of knowing where they came from and where they were going in their quest to control the HIV epidemic:

> You feel a bit relieved and empowered because you can tell that, you know the directions of where you're coming from and we know where you're going. …If we could talk of the control phase of the epidemic now for HIV, we are in the control phase because there were people behind us who were already doing a lot... I don't know where we will go, but yeah, I can tell that I'm also empowered [to do my work]. (Participant 4, RN, 2-5 Years of Nursing Experience)

Negative Job Attitudes

Negative job attitudes were described by three themes: frustration, burnout, and dissatisfaction.

Frustration. Frustration was expressed as nurses' feelings of being stressed, upset, or annoyed about conditions at work. A clear majority (n=15, 83%) of nurses reported feeling frustrated at work. Nurses often felt frustrated when they did not have the resources to do their jobs well, as was indicated by such examples as waiting for an ambulance to transport a patient or feeling the need to rush with their patients to get all their care done as a result of long queues of patients. Below is how one nurse described frustrations, especially their frustrations when they missed care that they know or felt like they should have done, that haunted them even hours after their work was done:

> What make me feel frustrated is in case you have given something wrong and now than when you go home, it will still haunt you so or perhaps you were

rushing there are certain things that you did not do, then when you go home you just be having that feeling, "No, I wish I could have done ABCD. So that really frustrates me." (Participant 2, EN, 2-5 Years of Nursing Experience)

Burnout. Nurses identified three areas describing burnout. More than half (56%, n=10) of nurses described some element of burnout related to their jobs. Nurses often described burnout as feeling like there was nothing they could do about the challenges at work, feeling tired psychologically, and feeling like they just wanted to give up. One nurse described feeling pain on the inside even though they kept doing their job, which reflected feelings of depersonalization in their work:

It did not affect my work. Although I am stressed inside there, I'm still doing the job, I'm still seeing the patient, I'm still doing my statistics even though inside there I'm feeling pain. (Participant 16, RN, 2-5 Years of Nursing Experience).

Dissatisfaction. Nurses described feelings of dissatisfaction about their jobs as a lack of feeling fulfillment or enjoyment in their work. Thirty nine percent (n=7) of nurses described feeling dissatisfaction about their work. Nurses expressed dissatisfaction about their work as feeling unhappy at work or feeling that their job was not a joy. They were dissatisfied with certain elements of their jobs, with their jobs as a whole at times, and even with their choice of nursing as a profession. One exemplary quotation, expressed by a nurse who no longer feels any passion toward nursing and is therefore unhappy with their job, demonstrates how nurses can be dissatisfied with nursing as a profession:

On the other hand, I am really not so much passionate about nursing... Really, okay, let me say I'm doing this because I have the ability to do it, and I have

people's needs and themselves at my heart. (Participant 17, RN, 2-5 Years of Nursing Experience).

Work Factors that Contribute to Job Attitudes

This section explores factors that contribute to nurses' job attitudes. These factors can be split into job factors and personal factors that affect job attitudes. However, the code of outcomes were reviewed, it became clear that patient outcomes impacted nurses' attitudes and also affected nurses' attitudes toward their jobs. Therefore, the factors that contribute to job attitudes are described in the following three categories: job factors, personal factors that contribute to job attitudes, and outcomes that contribute to nurses' job attitudes. Table 4.5 outlines a list of all factors that affected nurses' attitudes toward their jobs with descriptions from the interviews that further clarify these factors.

Table 4.5

Work-Related Factors That Affected Nurses' Job Attitudes

Theme	Description
Coworkers	• Mentorship from nurse mentors or physicians versus conflict with mentors • Teamwork versus conflict with peers • Recognition and appreciation from leadership, mentors, or government • Nurse staffing versus insufficient nurse staffing • Trained staffed versus burden on senior nurses to train new nurses • No physicians, pharmacists, or revenue collectors at clinics
Workload	• High numbers of patients • High number of tasks to perform • Nurses being expected to be available for emergency cases at all times of day • Integration of services (HIV, TB, primary care, immunization, antenatal) • Extending work hours way past scheduled work time without additional compensation
Access to information	• NIMART training helps with ART medications and other complicated aspects of HIV services • Guidelines help with ART medications and other complicated aspects of HIV services

Theme	Description
	• ART and HIV services are unique and different from other types of nursing, which requires nurses to need specialized knowledge above and beyond typical nursing education • Integration of services required nurses to have a large general body of knowledge to provide care for all individuals
Patient relations	• Positive patient rapport • Nurses receiving appreciation from patients • The respect and status of the nursing profession in the community • Patients' expressing dissatisfaction about care received • Lack of patient adherence to medications and care plan • Patient missed follow-up appointment or coming at unscheduled times
Material resources	• Housing/accommodation provided at the facility • Accessible clean water • Having a physical copy of nurses' job description on site • Cars/transport • Medicines, vaccines, and other supplies • Infrastructure of health facilities make it difficult to maintain patient confidentiality • Network for phone services • Thermometer, blood pressure cuff, or stethoscope for each nurse in each room • Guidelines for each nurses' room or lack of updated guidelines all together • Staff kitchen for breaks • On-site working toilet • Waiting room for patients • Facilities were dusty

Factors that contributed to nurses' attitudes are reflected in the following themes: coworkers, workload, access to information, patient rapport, and material resources. Each of these are described below.

Coworkers

Support from coworkers was expressed as the availability of nurses and other health professions, appropriately trained, who are able to work together as a team to provide care to patients. All nurses (n=18) interviewed identified support from coworkers as an important factor that contributed to their job attitudes. Most (n=16, 89%) nurses described lack of support from

coworkers as a factor contributing to their job attitudes. Nurses described teamwork, mentorship, and recognition from organizational leaders as important elements of this theme.

In this category, Nurses identified teamwork as a positive work-related factor that positively affected their attitudes toward their jobs. Nurses expressed that, through teamwork, they were able to share workloads, and that, if a less experienced nurse did not know how to care for a patient with a certain condition, they needed to feel that they could ask more experienced nurses for help. Nurses expressed the importance of teamwork among nurses and among other cadres of health professionals. Nurses described how teamwork helped them do their job better, improved their concentration, and provided each other a helping hand, sentiments captured in a quotation from one nurse:

> Like I've said, having teammates it's a great something at work because team is needed. 'Cause you can't do everything alone no matter how good you are, how best you are but everyone needs a hand or a helping hand, so if you are alone you'll be… You'll not just do your work well because knowing your concentration will be more like, am I going to finish, when am I going to finish, all those things. (Participant 6, RN, 6-10 Years of Nursing Experience)

Nurses described mentorship as having nurse and physician mentors who helped them provide high quality care, solve problems, and improve at their jobs. Nurses also expressed more positive job attitudes when they received recognition and praise for their work efforts from organizational leaders, administration, or governmental entities. Each facet of support from coworkers, teamwork, mentorship, and recognition from leaders positively impacted nurses' attitudes toward their jobs.

Several nurses also described the burden of lack of staff and lack of trained staff, which negatively impacted their job attitudes. Several nurses described the burden of training new recruits as increasing their demands at work. Although strong teamwork and strong mentorship were described by nurses as positively impacting their attitudes toward their jobs, nurses who described a lack of teamwork and conflicts with peers or mentors elicited a more negative attitude toward their jobs. One nurse described how a lack of staff at a facility led to greater frustration at work:

> To be alone [at the health facility], that makes me sometimes feel frustrated, feel exhausted all in once, oneness, all program, it becomes the very toughest challenge. And people think that this is just something that you do right and you give medicine but it requires thinking. And I don't like getting tired psychologically, it affects me badly. It's just the workload itself. (Participant 3, EN, <1 Year of Nursing Experience)

Workload

High workload was described by nurses' perception of how busy they were at work or the amount of work they had to do. All nurses interviewed (n=18) described high workload as a factor that impacted their attitude toward their job. High workload was associated with more negative job attitudes. Nurses described high workload due to high volumes of patients seeking care, too many tasks to be done, the need to be available 24/7 in case of patient emergencies, and the increased burden brought about by the recent integration of HIV services with general primary care. Nurses stated that they often needed to stay late past their scheduled end of day at 5pm, with some nurses saying that they stayed as late as midnight while they continued to see patients. After Namibia integrated HIV and primary care services at one location, a nurse

described how busy the workload has been, based on how much work and how many tasks had to be done throughout the day:

> Quite busy. We are always busy here in the clinic. ... But when integration came, we're forced to do things beyond our scope of practice, like... We're also doing antenatal care visit. We are doing postnatal, we are doing immunization, we're immunizing babies. We are also seeing general patients. That's why the day is quite busy. (Participant 13, EN, 2-5 Years of Nursing Experience)

Access to Information

Access to information was expressed as any job specific opportunity that allowed nurses to gain knowledge for themselves to do their jobs well. Of the nurses interviewed, 83% (n=15) identified access to information as an important factor affecting their attitudes toward their job, and 61% (n=11) identified a lack of access to information as a factor that contributed to their job attitudes. The main source of information resources identified by nurses were access to various training opportunities, including NIMART, and access to practice guidelines. Guidelines were booklets and manuals that outlined policies on how to provide different types of care. Nurses' identified the knowledge they gained from trainings or guidelines as affecting a more positive attitude toward their jobs. Nurse described the complexity of and unique needs for delivering HIV related services, including complicated ART medication regiments, which go well above their general nursing training. This research was also interested in discovering how NIMART training may have contributed to nurses' job attitudes. Nurses reported that NIMART training increased their knowledge about and experience caring for HIV patients, which, in turn, and gave them a sense of empowerment and enhanced their perceptions of job satisfaction because they

were better able to care for their patients. One nurse described how going to trainings, such as NIMART, enabled them to do a better job after the trainings:

> What I find…motivate[ional] at work, what motivates [me] more is, for example, when we go attend the workshop and I get more knowledge or I get experience that I was not having, then it motivates me to work very hard. (Participant 12, RN, 2-5 Years of Nursing Experience)

In addition, the integration of HIV services with general primary care services required nurses to provide skills and expand their knowledge about other types of nursing care. Several junior nurses who had not yet received trainings, such as NIMART, expressed concern about the difficulty learning the various ART medications, and they also had to rely heavily on more experienced staff who had this knowledge and who had received these trainings. Nurses described the lack of opportunities to gain knowledge as leading to more negative job attitudes. In addition, even nurses who had received NIMART training expressed frustration when the ART guidelines were updated, and they were unable to receive additional training on the updates to stay current on the changing standards of care. One nurse stated that she is unable to care for her patients without NIMART trainings, as that training is needed for her to know how to do her job well:

> I need those NIMART training so that I feel confident when I have to change patient to know all the factors and when to know that, maybe this is because of treatment failure. Let me put her on the second treatment or maybe is just because of the non-adherence. So, with NIMART training is really, really needed when you are working with ART. (Participant 9, RN, <1 Year of Nursing Experience)

Patient Rapport

Patient rapport was expressed as all positive experiences with the patients or the communities in which the nurses' served. Sixty-seven percent of nurses (n=12) described positive patient rapport as positively affecting their attitudes toward their jobs, and 56% (n=10) described patient demands as negatively affecting their job attitudes.

Nurses had more positive job attitudes when they had had longstanding relationships with patients, when patients thanked them, or when someone showed appreciation for the work they did. They also expressed positive job attitudes when they felt the community respected them because of the nursing's status as a profession. Below is a quotation with one nurse describing how, by simply saying "thank you," a patient can bring about a good feeling within them and pushed them to work harder:

> It's kind of encouragement when I help the patient…it encourage[s] me to do my work very well, because…you meet a patient, they sa[y], "Thank you ma'am, you helped me very well. God be with you." From there I feel good, I say, "Okay here I did well, that's why this patient is saying this to me. I have to work very hard, yes". (Participant 12, RN, 2-5 Years of Nursing Experience)

On the other hand, when patients treat nurses poorly, nurses experience more negative job attitudes. Nurses described patients complaining, patients not adhering to medications, patients not returning for scheduled appointments, and patients arriving at the facility intoxicated as all being associated with negative attitudes toward their jobs. Nurses also mentioned that threats of violence and actual violence toward staff also negatively impacted their attitudes about their jobs. One nurse described the negative emotions that they take home with them at the end of the day when patients have treated them poorly:

> And the patients they can say bad words to a nurse. And you did not do anything, for them they just want you to be fast. They can start talking a lot of things outside, that, "This nurse is slow, she's what… " swearing to you. Then at the end of the day when you go home or I go home, I feel that I was having a bad day. (Participant 12, RN, 6-10 Years of Nursing Experience)

Material Resources

Material resources were described as any physical equipment or infrastructure resources that enabled nurses to do their jobs well. Of the nurses interviewed, 61% (n=11) described access to material resources as affecting their job attitudes, and 84% (n=15) described the lack of material resources at work as negatively affecting their attitudes toward their jobs. These material resources included housing accommodations, access to clean water at the health facility, the facility infrastructure and room layout, and access to a car, transportation, medications, medical, communication technologies (phones and network access), safety equipment, and water. Having access to these materials improved nurses job attitudes, and a lack of access to these materials led to more negative job attitudes. Having access to a car or transport that was reliable was especially important for those sites because nurses also travelled to remote community locations to provide outreach and care for more patients. Many nurses mentioned the lack of rooms in which to see patients, as they felt they could not provide patient confidentiality when two nurses were seeing two patients in one room. Nurses described the lack of material resources as being frustrating, especially when it prevented them from doing their jobs:

> What frustrates me at work is the shortage of resources that we may have, that can also…that can hinder the performance of certain procedures. It frustrates me and many others that if you have to perform a certain procedure and the resources are

not available. Yes, it may frustrate me, yes. (Participant 17, RN, 2-5 Years of Nursing Experience)

Non-Work Factors That Affect Nurses' Job Attitudes

While the JD-R proposes that positive and negative job-related factors impact nurses' job attitudes (Bakker & Demerouti, 2007), the results of analysis in this study indicate that there were also other factors that affect nurses' job attitudes. These include the nurses' ability to be emotionally aware of and resilient to work stressors and the nurses' spirituality. In all cases, themes within this category of other factors that impact nurses' job attitudes evoked more positive feelings from nurses about their jobs than negative ones, thereby highlighting nurses' reliance on coping mechanisms to deal with stressors at work and their prevailing positive job attitudes that help them push through difficulties.

Resilience and Emotional Awareness. This sub-category represents nurses' ability to be aware of their own negative emotions or feelings at work, to take focus off of those negative feelings, and to focus instead on emotions that evoke positive feelings about their work and caring for their patients. Sixty-seven percent of all nurses (n=12) described emotional awareness as a way to maintain positive emotions at work. Nurses described this emotional awareness as enabling them to let go of frustration and refocus on their patients. They described their ability to depersonalize professional matters to avoid the negative internalization of job stressors that would impede their ability to do their work. One nurse described how they look at every challenge as an opportunity to grow, self-regulate emotions, and depersonalize professional matters, describing how their emotional awareness allows them to maintain positivity at work:

I just tell myself, "Okay…" It's like I've got control… I've got these self-regulating feelings that I have inside me that tells me that I should not take

> professional works too personal. But it's just like, I take every challenge as a learning opportunity, that's how I take my profession. (Participant 4, RN, 2-5 Years of Nursing Experience)

Spirituality. Spirituality was defined as nurses' spiritual or religious beliefs that helped them do their jobs. Twenty-eight percent of nurses (n=5) interviewed described spirituality as a coping mechanism to maintain positive job attitudes while at work. Namibia is a primarily Christian country (World Population Review, 2020), and all references to spirituality were so oriented. Nurses' cited their faith in God as a way to maintain hope, acceptance, and positive attitudes despite stressors at work. One nurse described how, even during stressful days, knowing that they had God's blessings helped them maintain a positive attitude:

> I think I feel fine, but it's just God's blessing sometimes. It's not sometimes, but at most. It's God's blessing. I always put God first in everything that I do considering the risk factors within the scope of practice, God is always there. So, I always acknowledge and praise His name that He is making me do the impossible that I cannot do, so I will keep it that way. I will just let God lead. (Participant 3, EN, <1 Year of Nursing Experience)

Outcomes That Affect Nurses' Job Attitudes

While the JD-R proposes that job attitudes impact outcomes, an interesting discovery in this study was nurses' reports that outcomes affected their job attitudes. Eighty-nine percent of nurses (n=16) interviewed described an outcome that impacted their attitudes toward their job. When patients were improving, their viral load suppression was increasing, and patients were more adherent with their medications, nurses described experiencing positive attitudes about their jobs. However, when patient outcomes continued to worsen despite nurses' best efforts,

nurses described feeling helpless, frustrated with their jobs, and more negative job attitudes. In the following quotation, one nurse described how she felt increased motivation when patients' viral loads became suppressed:

> So, and then the fact that most of the people, like the ARV [antiretroviral]s, the aim is actually to suppress the viral load. Now most of them, they are suppressed. That motivates me, that makes me like, "Wow, we are doing the job well and they are doing well too." (Participant 8, RN, >10 Years of Nursing Experience)

How Nurses' Job Attitudes Affect Their Ability to Do Their Jobs Well

The final aim of this paper was to explore how nurses' job attitudes affected their job performance and ability to do their jobs well. Findings in this area were coded according to the JD-R as *organizational outcomes*, or nurses' ability to do their jobs well. Organizational outcomes were organized into the two themes of positive and negative outcomes related to nurses' job attitudes. Nurses described how positive job attitudes improved their job performance, whereas negative job attitudes had the opposite effect.

Positive Outcomes Related to Nurses' Job Attitudes

This theme reflects nurses' descriptions of the positive feelings they perceived affected their ability to do their jobs well. Sixty-seven percent of interviewed nurses (n=12) described positive job attitudes that helped them do their jobs well and have more positive outcomes. Nurses believed that their positive job attitudes helped patients feel happier, decreased their mistakes, lessened conflict with peers, improved their desire to counsel patients on adherence, and decreased missed care. Table 4.6 lists positive outcomes related to positive job attitudes. One nurse described how she could only perform her work efficiently and effectively when she was in a happy state or a good mood:

> How it affects the ability to do the job is it... Whenever one is in a good mood or is in a happy state is only when you can be able to partake or to perform your work efficiently and effectively. (Participant 17, RN, 2-5 Years of Nursing Experience)

Table 4.6

Positive Outcomes of Nurses' Job Attitudes

Nurses say positive job attitudes…
• increased their drive to learn more knowledge • improved patient satisfaction • decreased their mistakes at work • decreased conflict with peers • increased their drive to coach patient about medication adherence to foster behavioral change • decreased their rush to complete work • increased their focus at work • decreased missed nursing care

Negative Outcomes Related to Nurses' Attitudes

This sub-category reflected nurses' description of attitudes that hindered their ability to do their jobs well. Largely negative attitudes increased nurses' perceptions that they were unable to do their jobs well. Fifty percent of interviewed nurses (n=9) described negative job attitudes that prevented them from doing their jobs well and that led to more negative outcomes. Nurses believed their negative job attitudes increased their mistakes at work, slowed down their work, made them rush through their work, and decreased their focus and concentration at work. Table 4.7 provides a list of how nurses negative attitudes affects their ability to do their jobs. One nurse described how, when they are frustrated, they feel fatigued, lose concentration, and can no longer focus to do their job well:

> Frustration can affect the ability because when you are working for a long time, when there is patient[s], they are a lot [of patients] sometimes… you can see the

state you were when you were starting the work is different in terms of concentration, in terms of… You might feel tired, even the brains… You know, the brain also depends. Yeah, if you get tired, the concentration might go away. Yes. (Participant 1, RN, 6-10 Years of Nursing Experience)

Table 4.7

Negative Outcomes of Nurses' Job Attitudes

Nurses say negative job attitudes…
• increase nurses' mistakes • decrease in work productivity • increase perception of nurses' needing to rush at work • decrease in nurses' ability to concentrate at their job

Summary of Results

Nurses' descriptions of job attitudes were described within the context of the JD-R, which provided a framework for examining nurses' job attitudes, factors that affected their job attitudes, and the ways that nurses' attitudes affected their ability to do their jobs well. Nurses' identified factors that were related both to their jobs and to other personal factors that contributed to nurses' attitudes about their jobs. Nurses indicated that care outcomes also affected their job attitudes, in contrast to the typical expectation of job attitudes affecting outcomes. Specifically, nurses reported that seeing their patients do well made them also want to perform better at work.

Discussion

This study explored nurses' perceptions of their job attitudes, the factors that contributed to their job attitudes, and the ways that their job attitudes affected their ability to do their jobs well. In doing so, study findings were interpreted in context of the JD-R (Bakker & Demerouti, 2007), as nurses in this study described relationships (both positive and negative) between job-

related factors and their job attitudes. This study also discovered that nurses perceived both positive and negative relationships between their job attitudes and organizational outcomes.

Nurses' Perceptions of Their Job Attitudes

Nurses in this study described positive attitudes about their jobs as motivation, satisfaction pride, and empowerment, and they described negative job attitudes as frustration, burnout, and dissatisfaction. Most nurses described experiencing both positive and negative attitudes about their jobs. Previous research on Namibian nurses' attitudes toward their job has been mixed. Awuku (2013) reported that, despite high stress levels at work for Namibian nurses, nurses experienced high levels of work engagement (Awuku, 2013), but Soilkki et al. (2014) reported that 45% of Namibian nurses did not feel motivated at work (Soilkki et al., 2014). More research, both qualitative and quantitative, is needed to better understand the mechanisms that describe Namibian nurses' attitudes toward their jobs.

Factors That Contribute to Nurses' Attitudes

The JD-R proposes that the main contributors to job attitudes are job conditions (i.e., job demands and job resources) (Bakker & Demerouti, 2007). Although conceptualized in this study as factors that affect nurses' job attitudes, several factors were consistent with the JD-R's conceptualization of job conditions. Specifically, the job factors described by nurses as affecting their attitudes were coworkers, workload, access to information, patient rapport, and material resources. Support from coworkers was a concept closely linked to nurse staffing, as nurses described needing properly staffed facilities with highly trained nurses to support each other. Staffing has been studied in the past as affecting nurses' job attitudes. Specifically, nurses' perceptions of staffing adequacy in outpatient settings has been associated with lower levels of

burnout (Chuang et al., 2017; Edwards et al., 2018) and increased job satisfaction (Friese et al., 2016; Gardner & Walton, 2011; Munyewende et al., 2014).

Nurses emphasized that knowledge and information enabled them to perform better in their jobs and function more independently. Nurses who took part in NIMART training described feeling empowered and able to independently care for their patients. These findings highlight the importance of making NIMART and other types of training accessible to nurses of all experience levels so they would feel competent and confident in delivering ART and HIV related services. Sustainable models that allow nurses to receive continued HIV training to improve their work and HIV care is important to maintain positive nurse attitudes.

Interestingly, this study uncovered two findings that do not necessarily fit within the JD-R. First, nurses described their job attitudes as being affected by personal rather than just job factors. These factors were, first, nurses' resilience and emotional awareness and, second, nurses' spirituality, both of which positively affected their attitudes toward their jobs. Second, nurses described outcomes, and particularly patient outcomes, as affecting their job attitudes, which implies a bidirectional relationship between job attitudes and outcomes explored more fully below.

This study identified two personal factors described by nurses that affect their attitudes about their jobs: resilience and emotional awareness; and spirituality. Resiliency has been studied in nursing and is defined as the ability of an individual to bounce back and cope with difficult situations as well as recover from stress and adversity (Hart, Brannan, & De Chesnay, 2014). In another study of nurse resilience, nurses who reported lower levels of resilience (reflective of burnout) also reported higher rates of personal mental health disorders such as posttraumatic stress disorder, anxiety, depression, and increased burnout (Mealer et al., 2012).

The Namibian nurses who participated in this study described areas of resiliency that helped them do their work, as they were able to view challenges as an opportunity to grow, self-regulate emotions, and not take professional matters too seriously. By drawing on their personal resiliency, these nurses were perhaps able to avoid the negative effects of their work that could lead to burnout. Nurses' in this study also described the importance of spirituality and their personal faith in God, which helped them cope and get through stressful times at work. Previous research results about nurses working in a US population indicate that fostering spirituality at work increased nurses' resilience (McDonald, Jackson, Wilkes, & Vickers, 2012). Further research is needed to better understand resilience among Namibian nurses and the factors that promote resiliency among Namibian nurses. Further qualitative research is also recommended to better understand how spirituality shapes both Namibian nurse attitudes and the ways that nurses deal with negative factors in their work environment. By understanding more deeply how these predictors of job attitudes are manifested in nurses, interventions can be tailored to improve nurse resilience and nurses' spirituality in order to promote more positive nurse attitudes and, in turn, more positive patient outcomes.

The second finding of interest from this study was the bidirectional relationship between nurses' job attitudes and outcomes. While this study supported the overall relationship from the JD-R that job attitudes affect organization outcomes, findings also suggest that outcomes, and specifically patient outcomes, affect nurses' job attitudes. Similar to our findings, a cross-sectional survey of 114 nurses across six units of a hospital reported that nurses who witnessed death or suffering in patients also reported higher levels of nurse burnout (Rushton, Batcheller, Schroeder, & Donohue, 2015). The findings of our study indicate that when a patient's viral load was improving, or when patients' status was improving, nurses felt as though they had helped

alleviate suffering in their patients and expressed positive attitudes toward their jobs. This finding suggests that when their patients experience positive outcomes, nurses have positive views about their jobs and believe they have done their jobs well. This bidirectional relationship between nurses' job attitudes and patient outcomes needs to be explored through future research to better understand how improvements in patient outcomes can be used to promote positive attitudes among nurses about their jobs.

How Nurses' Job Attitudes Affect Their Ability to Do Their Jobs

This study indicates that nurses perceived that their positive job attitudes influenced positive organizational outcomes. Nurses described their positive attitudes as helping lessen mistakes at work, contribute to patient satisfaction, decrease conflict with peers, decrease missed nursing care, and improve their focus at work. Other research about nurse attitudes in outpatient settings indicated that higher levels of nurses' job satisfaction was associated with lower levels of nurse turnover (Delobelle et al., 2011; Lelli et al., 2015; Poghosyan et al., 2017) and patient falls (Perry et al., 2018). On the other hand, a higher level of nurse burnout was associated with nurses' increased desire to call in sick (Plant & Coombes, 2003). Therefore, these results are consistent with past research that positive nurse attitudes are associated with more positive outcomes and increased ability for nurses to do their jobs well, and more negative job attitudes are associated with more undesirable outcomes and decreased ability to their jobs well. Further research is needed to understand the relationship between Namibian nurses' attitudes and organizational outcomes, as this study only observed nurses' perceptions of their ability to do their jobs well. Thus, future research using both quantitative and qualitative approaches will help us better understand how nurses' attitudes affect their work and a variety of organizational outcomes.

Study Limitations

The major limitations of this study pertain to the sampling process. While attempts were made to evenly represent ENs and RNs, logistical challenges and the feasibility of recruiting both ENs and RNs at the study sites made this goal impossible to achieve. Thus, the study's sample reflects a slight oversampling of RNs, which must be considered when interpreting these results because their additional education may influence their job attitudes. In addition, 50% of nurses in the sample had graduated from their nursing programs within the previous three years, which gave them fewer years of experience to draw on when they participated in interviews. This problem was compounded when nurses expressed different work experiences based on their age, particularly related to one job factor, support from coworkers. Junior nurses expressed having access to senior nurses to answer questions as a job resource, whereas senior nurses expressed the constant need to answer nurses' questions as a job demand. Further work should examine this difference qualitatively by purposefully sampling nurses at different stages in their careers to understand how they work together. Despite these limitations, my study contributes to the literature by exploring nurses' job attitudes in Namibian outpatient settings, factors that shape their job attitudes, and the ways that their job attitudes affect their ability to carry out their work.

Conclusions and Recommendations

Namibian nurses working in outpatient settings that deliver HIV services expressed both positive and negative job attitudes about their work. These attitudes are impacted by several job-related factors as well as nurses' personal characteristics and patient outcomes. Nurses perceived that positive job attitudes had a positive impact on outcomes, but negative job attitudes negatively impacted on organizational outcomes. To understand the interventions needed to promote positive nurse job attitudes, further research is needed on ways to increase positive job

factors, such as making investments in human resources (improving support form coworkers), providing material resources, facilitating positive patient relations, and supporting nurses by providing opportunities to increase their knowledge. Because nurses are largely responsible for outpatient HIV care in Namibia, nurses identified the need for continued opportunities to access information and improve knowledge in managing and prescribing ART medications. A primary recommendation is to further investigate resiliency among Namibian nurses, both what it represents and how it can be promoted. This study indicates that nurses' job attitudes are important, that various factors contribute to nurses' attitudes, and that nurses' attitudes affect their ability to do their jobs in various ways. Thus continued research on the nursing workforce in Namibia should explore how to address how to address factors affecting nurses' attitudes toward their jobs as critical to outcomes of the Namibian health care system and how to identify and implement interventions to promote positive job attitudes to assure the highest quality health services to Namibians.

CHAPTER 5: DISCUSSION

This dissertation examined the impact of nurse staffing and nurse attitudes on HIV-related outcomes in outpatient departments of public hospitals, health centers, and clinics in Namibia. Guided by the JD-R, this research sought to uncover the job conditions that impact nurses' attitudes and, in turn, organizational outcomes. This dissertation was completed by preparing three publishable papers, each focused on different aspects of the JD-R, to better understand the Namibian nursing workforce providing HIV services in outpatient settings.

The research questions addressed in this dissertation are discussed below, along with brief descriptions of how each question was addressed:

1. What are the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings?

This question was answered by conducting a scoping review, which examined relationships among nurse staffing, nurse attitudes and organizational outcomes. The findings of this review are presented in Chapter 2.

2. What is the relationship between nurse staffing and organizational outcomes in a sample of Namibian outpatient health facilities that provide HIV care?

This question was addressed in both Chapters 2 and 3 first by conducting a scoping review on the relationship between nurse staffing and organizational outcomes in outpatient settings and then by conducting a quantitative analysis of the relationships between nurse staffing and two key HIV outcomes, VLD and VLS.

3. What are Namibian nurses' attitudes toward their jobs?

a. What factors contribute to nurses' attitudes about their jobs?

b. How do nurses' attitudes about their jobs contribute to organizational outcomes?

This question was also addressed in Chapters 2 and 4. First, a scoping review was completed of the literature on nurse attitudes in outpatient settings. Then, a descriptive qualitative study using directed content analysis of semi-structured interviews with Namibian nurses who provide HIV care in outpatient settings was conducted. Together, these approaches provided a more comprehensive understanding of Namibian nurses' attitudes about their jobs and the ways that those attitudes affect their work.

This chapter synthesizes findings across chapters to describe how job conditions affect Namibian nurses' job attitudes and how job conditions and nurses' job attitudes affect HIV outcomes in Namibian outpatient settings. In the following sections, a summary of major findings is presented first, which includes summaries of each chapter to discern the overall meaning of research findings. The limitations to generalizability, along with the implications for research, theory, practice, and policy, are presented second.

Summary of Major Findings

This dissertation addressed its three aims by conducting three different but related analyses that are included as three separate, publishable papers. The first paper reports the findings of a scoping review on nurse staffing, nurse attitudes, and organizational outcomes. Next, the second paper used a secondary analysis design of existing data to examine the relationship between nurse staffing and HIV outcomes (VLD and VLS) in Namibia. Finally, the last paper presents the findings of a qualitative descriptive study developed through directed content analysis that examined the job attitudes of nurses delivering HIV care in Namibian

outpatient settings. Table 5.1 summarizes the findings of all analyses. The sections that follow highlight the key findings from each study.

Table 5.1

Synthesis of All Dissertation Findings

Study	Purpose	Theory Concepts	Sample	Methods	Key Findings
Study 1: nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings	To understand the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings.	Job conditions (nurse staffing, conceptualized as either a job demand or resource), nurse attitudes (conceptualized as burnout or engagement), organizational outcomes	39 articles	Scoping review	• Nurse staffing measured in a variety of ways was consistently associated with better outcomes: decreased nurse turnover, increased patient satisfaction, and improved patient outcomes • Few studies used objective measures of nurse staffing in outpatient settings; the most common measure of nurse staffing was "staffing adequacy," as perceived by existing nursing staff • Only two job attitudes were reported in the literature as being associated with nurse staffing: job satisfaction and burnout • The only job attitudes studied with organizational outcomes were job satisfaction and burnout, with job satisfaction associated with better organizational outcome and burnout associated with worse organizational outcomes • Very few studies examined nurse staffing in outpatient settings
Study 2: The relationship between nurse staffing and hiv outcomes in Namibia	To explore relationships among nurse staffing in Namibian hospitals, health centers, and clinics in areas of high HIV burden and HIV-related organizational outcomes, specifically VLD and VLS, as predictors of successful ART treatment.	Job conditions (nurse staffing, conceptualized as either a job demand or resource), and organizational outcomes	66 health facilities in Namibia	Secondary data analysis of nurse staffing, as measured by WISN, relative to key organizational outcomes of HIV care, VLD and VLS	• The continuous WISN measure predicted VLD, even after controlling for covariates • Insufficient staffing (measured based on a categorization of WISN data) produced worse VLD than sufficient staffing • There were no differences between the sufficient staffing and overly sufficient staffing groups • Neither the continuous or categorical WISN variables were significantly associated with VLS, after covariates were controlled for
Study 3; Namibian nurses' attitudes about their jobs	To examine: 1) nurses' perceptions of attitudes toward their jobs, 2) factors that contribute to nurses' job attitudes, and 3) how nurses' job attitudes affect their ability to do their jobs well.	Nurse attitudes	18 Namibian nurses	Qualitative description with directed content analysis of semi-structured interviews with Namibian nurses about their job attitudes	• Nurses described positive job attitudes as feelings of empowerment, motivation, pride, and satisfaction; and they described their negative job attitudes as burnout, dissatisfaction, and frustration • Predictors of job attitudes fell into three categories: job factors, personal factors, and patient outcomes o Job factors included support from coworkers, workload, access to material resources, access to information, and patient rapport. Personal factors included 1) spirituality and resiliency and 2) emotional awareness • Patient outcomes were reported to shape nurses' job attitudes by increasing the drive to learn more at work, improve patients' satisfaction, decrease mistakes, decrease peer conflicts, increase the drive to coach patients on medication adherence, increase focus while at work, and decrease missed nursing care

Chapter 2 (Paper 1) Nurse Staffing, Nurse Attitudes, and Organizational Outcomes in Outpatient settings: A Scoping Review

This chapter sought to understand the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings by conducting a scoping review (Tricco et al., 2018). The review informed the analyses conducted in other chapters and thus touched on all three research questions of this dissertation. The major findings of this analysis are as follows:

1. In general, nurse staffing, examined using a variety of different measures, had a positive impact on nurses' positive job attitudes and organizational outcomes. Various measures of nurse staffing were associated with decreased nurse turnover (Chuang et al., 2017; Ireland et al., 2004), increased patient satisfaction (Graveley & Littlefield, 1992; Thompson et al., 1982), improved patient outcomes (Griffiths, Murrells, Dawoud, & Jones, 2010; Lukewich et al., 2016), and increased quality of care (Griffiths et al., 2011). Nurses' positive perceptions of nurse staffing adequacy was associated with increased nurse job satisfaction and decreased nurse burnout.
2. Unlike nurse staffing research conducted in hospitals, nurse staffing research focusing in the outpatient setting largely neglected the use of objective measures of nurse staffing such as FTEs, patient-to-nurse ratios, and workload-based nurse staffing measures, including the WISN (examined in a later chapter of this dissertation). Most studies of nurse staffing in outpatient settings measured staffing subjectively, as nurse perceptions of staffing adequacy.
3. Several studies examined nurses' job attitudes in outpatient settings, the setting of focus in this dissertation. In these studies, nurses' job satisfaction was inversely related to turnover (Lelli et al., 2015; Poghosyan et al., 2017). However, nurses' job dissatisfaction

and burnout were associated with increased patient falls (Perry et al., 2018), and nurses' desire to take sick leave (Plant & Coombes, 2003). Only six studies examined the relationship between nurses' job attitudes and organizational outcomes in outpatient settings. No studies were found that examined any job attitudes other than job satisfaction and burnout, a dearth that emphasizes the gap in the literature on understanding nurses' job attitudes in outpatient settings.

4. The JD-R, which guided this study, proposes that job attitudes mediate the relationship between job conditions and organizational outcomes (Bakker & Demerouti, 2007). Despite this hypothesized relationship, no studies were found that examined whether nurses' job attitudes mediated the relationship between nurse staffing and organizational outcomes in the outpatient setting.
5. Although existing evidence on nurse staffing, nurse attitudes, and organizational outcomes largely supports the JD-R, no studies were found that used the JD-R to guide the research.
6. Research needs in three majors' areas were identified. First, research in outpatient settings is needed that measures nurse staffing objectively, as FTEs, patient-to-nurse ratios, or workload-based nurse staffing measures, including the WISN. Second, very few studies examined the relationship between nurse staffing and nurse attitudes in outpatient settings. Third, future research should be designed to test the hypothesized mediation effects of nurse attitudes on the relationship between nurse staffing and outcomes.

Chapter 3 (Paper 2): The Relationship Between Nurse Staffing and HIV Outcomes in Namibia

The purpose of this analysis was to explore relationships between nurse staffing in Namibian hospitals, health centers, and clinics in areas with high HIV burdens and the HIV-related organizational outcomes of VLD and VLS, both indicators of successful ART treatment. This analysis examined nurse staffing, measured using the WISN ratio, to determine how nurse staffing levels affected VLD and VLS at a facility level. The WISN assessed nurse staffing based on a ratio of the number of actual nurses relative to the number of nurses needed at the facility, accounting for nurses' workload. This cross-sectional, secondary analysis used data for FY 2018 gathered from Namibian health facilities by IntraHealth as part of a project evaluation. Data were analyzed through Poisson regression. Two models were tested, each examining a key outcome variable (VLD and VLS). The following are the major findings of this paper:

1. The WISN ratio was operationalized as both continuous and categorical variables, with the categorical variables assessed at three levels: insufficient nurse staffing (defined as a ratio of <0.74), sufficient nurse staffing (defined as a ratio of 0.75-1.99), and overly sufficient nurse staffing (defined as a ratio >2). Both WISN variables predicted VLD, even after controlling for covariates. Insufficient nurse staffing was associated with lower levels of VLD, and the continuous WISN variable was positively associated with VLD. This finding supports previous research that indicates a strong relationship between nurse staffing and patient outcomes, in this case VLD.
2. According to the WISN categorical variable, settings with insufficient levels of nurse staffing had lower levels of VLD when compared to settings with sufficient levels of nurse staffing. However, there was no significant relationship between over staffed areas

(relative to sufficient nurse staffing) and VLD. This finding reflects the importance of a sufficient level of nurse staffing to improve the outcome of VLD, but staffing beyond that level may be unnecessary.

3. Neither the continuous nor the categorical versions of WISN were significant predictors of VLS. An initial analysis indicated that significant predictors of VLS were skill mix, number of patient visits in a six-month period, percent of facility patients in certain age categories, percent of poverty, average household consumption, and percent literacy. Although not assessed in this study, VLS may be more sensitive to patient-level factors, such as health behaviors, and country- or regional-level factors, such as medication stockouts, than to nurse staffing. In interpretations of these results, it is important to note that, because VLS is dependent on VLD (i.e., VLS is calculated as the number of viral loads suppressed out of the total number of viral loads documented), viral load documentation should be a key focus for facilities that wish to improve the patient outcome of VLS.
4. Although the findings of this analysis verify the importance of nurse staffing, as measured using WISN as a predictor of VLD, other important variables, particularly nurse attitudes, were unavailable for use in the analysis. Future research should focus on integrating nurses' attitudes as a possible mediator of the relationship between nurse staffing and VLD, as indicated by the JD-R.

Chapter 4 (Paper 3): Namibian Nurses' Attitudes About Their Jobs

The aims of this paper were to examine 1) nurses' perceptions of attitudes toward their jobs, 2) factors that contribute to those job attitudes, and 3) ways that nurses' job attitudes affect their ability to do their jobs well. This study was a qualitative descriptive study, with directed

content analysis of 18 semi-structured interviews with Namibian nurses across public health facilities in regions with high HIV burdens. Major findings indicate the following:

1. Nurses have positive and negative attitudes related to their jobs in Namibia's public health facilities. Their positive job attitudes included feelings of empowerment, motivation, pride, and satisfaction. Their negative job attitudes included burnout, dissatisfaction, and frustration. Although it was not possible to determine whether the nurses held more positive or negative job attitudes at the time of the interview, almost all nurses described a mix of both positive and negative job attitudes.
2. There were three main themes identified that reflect factors that contributed to nurses' job attitudes: 1) job-related factors, 2) personal factors, and 3) patient outcomes. The JD-R proposes that job conditions, similar to the job-related factors described by nurses in this study, impact job attitudes (Bakker & Demerouti, 2007). My findings suggest that other personal factors, including personal resilience, emotional awareness, and faith in God, which nurses described as helping them cope with adversity at work, also impact their job attitudes, The JD-R also indicates that job attitudes impact the outcomes of patients (Bakker & Demerouti, 2007). However, nurses in this study reported that their attitudes were also affected by the outcomes of patients for whom they provided care; that is, nurses' attitudes improved when nurses observed improvements in their patients' outcomes.
3. Nurses participating in this study also indicated that their job attitudes affected their ability to do their jobs well. Nurses indicated that, when they had positive job attitudes, they noticed that their patients were happier, they made fewer nursing mistakes, they were more focused on their work, and they missed fewer important nursing care

activities. Nurses also indicated that, when their job attitudes were negative, they were more prone to make mistakes, felt rushed in doing their work, and felt less able to focus and concentrate on their work. Thus, nurses' job attitudes were important in helping them do their jobs well.

Figure 5.1 overviews all findings described above. Chapter 2 highlighted previous nurse staffing research that indicates a relationship between nurse staffing and organizational outcomes in outpatient settings. However, only a few of the studies cited used objective measures of nurse staffing, such as patient-to-nurse ratios or nursing FTEs; instead, most of these studies used nurse reports of staffing adequacy based on nurses' perceptions or recall. In addition, very few articles analyzed the effects of nurse staffing and patient outcomes. Using the objective measure of the WISN, Chapter 3 addressed this gap in knowledge by examining the relationship between nurse staffing and HIV patient outcomes in Namibian outpatient settings (specifically VLD and VLS). However, despite being focused in Namibia, these findings are somewhat generalizable to other outpatient settings, especially other low-resource settings that provide HIV services in areas with high HIV burdens. Nurse staffing in this study was measured through the WISN ratio, a staffing measure that was developed based on nurse workload. Findings from this study indicate that nurse staffing, measured as sufficient via the WISN, increased VLD but had no effect on VLS. This finding suggests that having a sufficient level of nursing staffing can improve a facility's VLD, as nurses are the health professional responsible for VLD. Further research is needed to better understand the myriad factors that may affect VLS and to determine whether it is sensitive to nurse staffing levels.

The literature review reported in Chapter 2 also indicated that very little research has been published on nurses' attitudes toward theirs jobs in outpatient settings. Previous research on

nurses' attitudes indicates that nurses' perceptions of adequate nurse staffing was associated with increased nurse job satisfaction (Friese & Himes-Ferris, 2013) and decreased nurse burnout (Chuang et al., 2017). Also, higher levels of nurse job satisfaction were associated with lower levels of nurse turnover (Poghosyan et al., 2017), and higher levels of nurse burnout increased nurses' desire to take sick leave (Plant & Coombes, 2003). However, only six articles were found that examined the relationship between nurses' job attitudes and patient outcomes in outpatient settings, and, in these studies, the only two job attitudes examined were nurses' job satisfaction and burnout. Those studies did show that nurses' job satisfaction was inversely related to turnover (Lelli et al., 2015; Poghosyan et al., 2017). Nurse job dissatisfaction and burnout have also been associated with increases in patient falls (Perry et al., 2018) and in nurses' desire to take sick leave (Plant & Coombes, 2003). There was very little in the literature about nurses' attitudes in outpatient settings. This gap was then addressed in Chapter 4, which explored how nurses describe their job attitudes in outpatient HIV services in Namibia.

To better understand how nurse attitudes affect their work, Chapter 4 presented a qualitative descriptive study that used interviews with Namibian nurses working in public health facilities to explore nurses' job attitudes broadly and beyond the two attitudes (job satisfaction and burnout) identified in Chapter 2. Nurses reported the attitudes of empowerment, motivation, pride, dissatisfaction, and frustration. Nurses stated that their job attitudes were also affected by several job-related factors, including support from coworkers, material resources, access to information and educational opportunities, workload, and relationships with patients. However, nurses also indicated that personal factors, such as their resiliency and emotional awareness as well as spirituality helped them overcome adversity at work and improve their job attitudes. Importantly, when patients' outcomes improved, nurses' job attitudes also improved. Nurses also

described how their positive job attitudes made their patients happier, decreased their own propensity to make mistakes, created less conflict with coworkers, helped them assist their patients to address such concerns as medication adherence, made them feel less rushed at work, and helped them miss fewer nursing care activities.

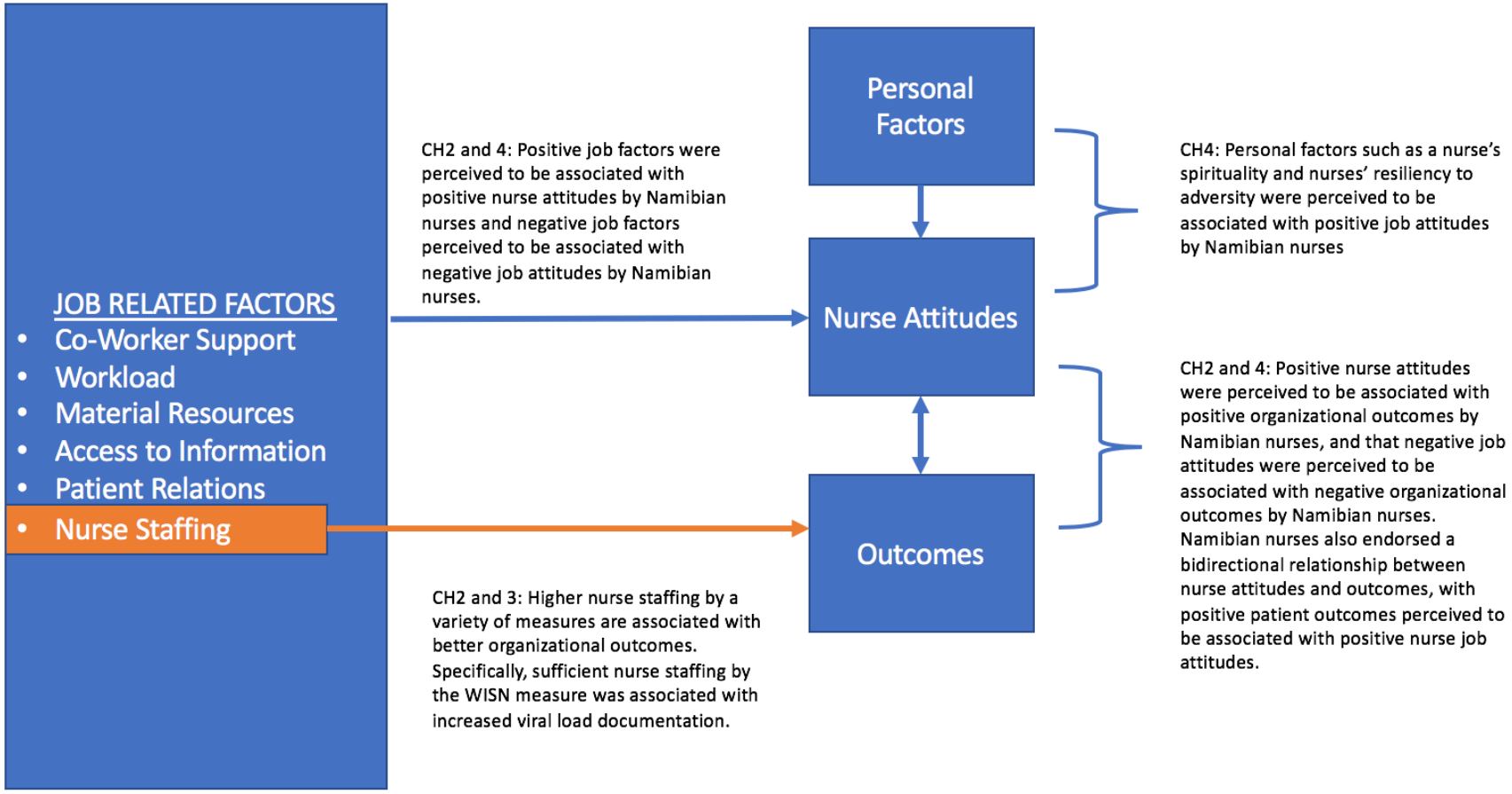
To better understand how nurses' attitudes about their jobs might affect the relationship between nurse staffing and organizational outcomes, the findings reported in Chapter 3 indicate that having sufficient nurse staffing is important for improving the organizational outcome of VLD. However, findings reported in Chapter 4 suggest that certain factors contribute to nurses' job attitudes, which may help explain the relationship between nurse staffing and organizational outcomes. Specifically, support from coworkers, teamwork, strong mentorship, and positive recognition from leaders were described by nurses as being important elements of their work, which positively affected their job attitudes. However, nurses reported that their attitudes were negatively affected when staffing was limited or when they worked with inadequately trained nurses. Given that nurses described a positive relationship between their job attitudes and their ability to do their jobs well, it suggests that, in keeping with the JD-R, nurses' job attitudes may mediate the relationship between job-related factors (or job conditions) and organizational outcomes.

This dissertation reinforces the relationship between nurse staffing and organizational outcomes, specifically VLD. It also indicates that Namibian nurses perceive that certain job-related factors or job conditions, such as support from coworkers, nurse staffing, material resources, access to information, workload, and patient rapport, affect their attitudes toward their jobs and that, in turn, their job attitudes affect their ability to do their jobs well. Further research is needed to assess nurses' job attitudes, particularly those attitudes described by nurses here that

have not been examined quantitatively elsewhere, in an effort to test the possible mediating effect of nurses' attitudes in the relationship between nurse staffing and organizational outcomes. However, this dissertation's results highlight the importance of nurse staffing and nurse attitudes as they each relate to organizational outcomes.

Figure 5.1

Overview of Dissertation Findings



Strengths of the Dissertation

There are several strengths of this dissertation. First, this dissertation was guided by the JD-R, which proposes relationships between job conditions (job resources, job demands), employee attitudes, and organizational outcomes. This model allowed us to view the relationships between factors that affect nurses' attitudes, specifically, nurse staffing, and organizational outcomes. By approaching a scoping review through this lens, this dissertation examined the literature on the relationships between nurse staffing and organizational outcomes, between nurse staffing and nurses' attitudes, and between nurses' attitudes and organizational outcomes. This theory also helped highlight gaps in the literature—namely the relationship between a job condition, nurse staffing, and the organizational outcomes of VLD and VLS in outpatient settings—and the possible mediating effect of nurse attitudes on the relationship between nurse staffing and organizational outcomes. These analyses were then complemented by the qualitative analysis reported in Chapter 4, which sought to understand nurses' attitudes, the factors that contributed to their attitudes, and the ways that nurses' attitudes affected their ability to do their jobs well. The JD-R provided guidance for examining the relationships among nurse staffing, nurse attitudes and organizational outcomes in outpatient settings, a health sector that has received limited attention in past research. Knowledge of these relationships will become increasingly important, as health care delivery shifts further into outpatient settings and as nurses' roles in them continue to evolve.

Second, this dissertation used the WISN ratio as a measure of nurse staffing, which has not been used in previous research. The WISN is a tool that has been used extensively by administrators and policymakers around the world to make staffing decisions. The WISN provided an objective measure of nurse staffing at a facility level that was based on an

assessment of the particular workload of the facility. By using this measure of nurse staffing, the dissertation adds to the body of knowledge about the objective measurement of nurse staffing, particularly the measurement of nurse staffing in outpatient settings.

Third, there has been minimal research on nurse staffing in outpatient settings, particularly on how outpatient nurse staffing levels affect patient outcomes. In addition, very few studies have examined the relationship between nurse staffing in outpatient settings and HIV patient outcomes. This dissertation adds to the body of knowledge by examining the relationship between nurse staffing in outpatient settings and the HIV outcomes of VLD and VLS. Neither of these outcomes has been examined in previous studies of nurse staffing in outpatient settings. However, nurse staffing and the roles of nurses in outpatient settings that provide HIV care are critically important to engage patients in their care, follow up on patients' adherence to medication regimes, and manage patients' overall HIV care.

Fourth, this dissertation examined nurse attitudes in outpatient settings, an area in which only six previous studies had examined the relationship between nurse attitudes and organizational outcomes. This dissertation therefore fills a gap in the literature and contributes important information to help the field better understanding how nurses, particularly those working in Namibian outpatient facilities, describe their attitudes toward their job, the factors that contribute to their attitudes, and the ways that their attitudes affect their ability to do their work. This dissertation's results demonstrate that, in Namibian outpatient settings, nurses felt empowerment, motivation, pride, satisfaction, burnout, dissatisfaction, and frustration. These attitudes were impacted by job factors and personal factors of nurses, and these attitudes impacted nurses' ability to do their jobs well. These findings added to the body of knowledge on outpatient nurse job attitudes.

Finally, a major strength of this dissertation is the setting in which it took place. The overwhelming majority of research on the relationships among nurse staffing, nurses' attitudes and patient outcomes, including research focused on outpatient settings, has been conducted in high-income countries, namely the United States. This dissertation was conducted in Namibia, a middle-income country with limited resources for health care compared to most high-income health systems. However, the decentralized model of care in Namibia, with its emphasis on care delivery in outpatient public health facilities, provides an important global context for situating and understanding nurse staffing research, particularly outside of the United States.

In summary, the strengths of this dissertation are its guidance from the JD-R, its use of the WISN ratio as a measure of nurse staffing, its specific focus on the outcomes of HIV care, its use of qualitative interviews to better understand nurses' attitudes, and its focus in an outpatient setting. The results of this study contribute knowledge about the relationships among nurse staffing, nurses' attitudes, and outcomes of HIV outpatient facilities in Namibia, which can be used by policymakers to improve the working conditions for nurses working in Namibia. Policymakers should look toward interventions that increase nurse staffing levels, as increased staffing levels by the WISN is associated with increased VLD. Policymakers should also look to ways to improve nurses' attitudes, as nurses' perceptions of their attitudes are associated with their ability to do their jobs well. A better understanding how nurse staffing and nurses' attitude affect HIV patient outcomes may also improve the lives of those living with HIV in Namibia.

Limitations to Generalization of Dissertation Findings

There were also several limitations of this dissertation that are important to address. First, the unit of analysis for this dissertation was the facility level. This focus prevented the focus on patient-level differences, such as gender or age, in the analysis. Gender and age are both

important patient-level factors that predict VLS in Namibia, as VLS is higher in women than in men, and younger age groups, such as adolescents and young adults, do not adhere to medication regimens as well as older adults do (Phia Project, 2018). To account for these potential gender and age differences, the percentage of females and the percentages of individuals in different age category were included at a facility level. Yet accounting for patient-level factors via multi-level modeling may be especially important in understanding the relationship between nurse staffing and VLS. To overcome this limitation, this project was able to account for several of these patient-level variables (gender and age) by aggregating them to the facility level.

In addition, this analysis did not consider nurse-level factors, such as years of nursing experience, nurse education, or training in the analysis. However, gathering individual data from nurses at the 73 geographically diverse and dispersed facilities included in quantitative analyses was not feasible in this secondary data analysis, given the limited budget and the time constraints of this dissertation. Also, there were temporal considerations that were impossible to plan for and integrate into data collection efforts.

A second limitation of this dissertation was the inability to measure and account for nurse attitudes in the quantitative analysis. While the JD-R proposes that nurse attitudes mediate the relationship between nurse staffing and organizational outcomes, no previous research has examined this relationship in the outpatient setting. Gathering primary data from nurses in the 73 Namibian facilities, although possible, would have been poorly timed from a theoretical standpoint, as the secondary data used in this quantitative analysis was collected two years ago. Thus, this analysis could have been strengthened by examining nurse attitudes as either a covariate or mediator in the relationship between nurse staffing and organizational outcomes. However, an attempt to better understand nurse attitudes was undertaken by qualitatively

interviewing nurses about their job attitudes, which provided new insights in understanding nurses' attitudes about their jobs.

Another limitation of this dissertation is the lack of patients' perspective. For chronic diseases such as HIV that require self-management strategies, particularly medication adherence and behavioral modification, understanding patients' perspectives about living with their disease is essential. Also, understanding patients' perspectives can inform the development of patient-centered interventions that engage patients in their care and help them overcome barriers that prevent them from achieving important HIV goals. Understanding patient perceptions of nurse staffing could also illuminate how nurses influence their HIV care and outcomes. However, the qualitative interviews that were conducted as part of this dissertation examined nurses' attitudes about their work that potentially affect HIV patient outcomes. Because nurses are key providers of HIV services in Namibia, their views on their ability to deliver care are key to better understanding how to provide the most optimal services to Namibians living with HIV.

A final limitation of this work was that the second paper of this dissertation relied on secondary data. The limitations of using secondary data include the inability of researchers to select the measures of interest, therefore limiting the study to variables available in the dataset and to those measured in the original assessment. In addition, variables with incomplete or missing data were omitted, which could have biased my study's findings. Also, using secondary data means that key variables often have to be omitted because they are unavailable in the dataset. Such was the case in this analysis, as there were variables that were important to my analysis yet unavailable in the dataset. For example, I had hoped to examine the impact of medication stockouts (a regional- or country-level variable), but, despite the importance of medication stockouts from a theoretical standpoint (especially in VLS), data were incomplete

and were therefore omitted. The use of secondary data also focused this dissertation solely on Namibia and solely on the regions with high prevalence of HIV where IntraHealth implemented its interventions. This restriction in data thus limited the sample size, as the data was only available for 73 facilities in Namibia. Once the data was accessed, only 66 of the facilities had complete data. Thus, the small sample size could have biased the results and limited the generalizability of this dissertation's findings to other settings and other countries. Despite the limitations of using secondary data, this dissertation would not have been possible otherwise, and, with this secondary data, it was able to analyze nurse staffing by using a novel nurse staffing variable in research to understand the relationship between nurse staffing and the organizational outcomes of VLD and VLS.

Despite the limitations noted here, this dissertation examined nurses working in outpatient, public health facilities across the country of Namibia who were trained to initiate and manage HIV care for patients living with HIV in remote areas of Namibia. Gaining a better understanding of how nurse staffing affects VLD and VLS for patients who receive care in these Namibian facilities and how nurses' attitudes about their jobs affect their ability to do their jobs well is important.

Implications

Future Research

The findings of this dissertation point to several research implications. First, to understand the relationships between the constructs of the JD-R in outpatient settings, further research is needed to explore the possible mediation effect of nurse attitudes on the relationship between nurse staffing and organizational outcomes. Although no previous work has examined this possible mediating effect (Chapter 2), analyses conducted as part of this dissertation

(Chapter 4) identified job attitudes that were important to Namibian nurses in doing their jobs well. Further examination of a possible mediation effect, completed by measuring key job attitudes of Namibian nurses working in outpatient settings, could help explain the mechanisms through which nurse staffing affects organizational outcomes in Namibian public health facilities. Such research could inform the development of interventions to improve the attitudes nurses working in these and foster outcomes in outpatient settings and could also contribute theoretically to work using the JD-R.

Second, multi-level modeling that includes both patient specific characteristics and facility level characteristics is needed to understand more fully the relationships between nurse staffing, nurses' attitudes, and HIV outcomes in Namibia. HIV is a complex disease that requires patients to be enrolled in high-quality health services, involved in their own care, and engaged in healthy behaviors and self-management of their disease. Although this dissertation focused on the outcomes of HIV care at a facility level, which is largely provided by Namibian nurses, it did not account for the individual-level characteristics of patients that may affect HIV outcomes or a wider range of facility-level characteristics, such as the acuity level of patients seen in the facility, that may also affect outcomes. Future research should incorporate multi-level modeling of both patient and facility level characteristics and perhaps even regional or national characteristics (e.g., availability of ART medications) to better understand the relationship between nurse staffing and HIV outcomes.

Third, one of the findings from this dissertation indicated that there was no significant relationship between nurse staffing and patient VLS. Although this does not mean that nurses have no impact on VLS, researchers need to better understand the effect that nurses have on VLS. For example, the type of education nurses provide to patients about their medications and

lifestyle could affect patients' VLS. This research need could be addressed in one of two ways. First, future qualitative research with patients could help us understand how patients perceive nurses or how nurses could affect patients' medication adherence or health behaviors that are important in the management of HIV disease and treatment. Both could better illuminate nurses' roles in VLS. It will also be important to know the factors that patients perceive as important contributors to their ability to adhere to their medication and, in turn, suppress their viral loads. Second, future qualitative work with nurses, specifically on what they currently do to educate patients about activities that support VLS and on how they view their roles in VLS, could also illuminate knowledge of nurses' role in VLS. A better understanding of patients' and nurses' perspectives could fill some of the gaps that might help explain the relationship between nurse staffing and VLS.

Fourth, future research should more fully explore use of the WISN ratio in nurse staffing research. This dissertation used the WISN ratio as a measure of nurse staffing, which has not been previously used in nurse staffing research. My results indicate that there is as association between the WISN ratio and VLD. This finding suggests that future research could help determine the value of this measure in nurse staffing research and help understand the relationship between WISN-based staffing and organizational outcomes. Comparisons of the WISN-based staffing measure to other nurse-staffing measures could also help assess the utility of this measure against others. Future research that explores relationships between the WISN-based nurse staffing measure and patient and organizational outcome measures in other settings could illuminate the potential utility of WISN in measuring nurse staffing in settings outside of outpatient care. Because WISN is widely used in a variety of countries, it could provide a measure of nurse staffing that would allow the comparison and standardization of nurse staffing

measures for research purposes. This research is both important to better understanding the impact of nurse staffing on outcomes and on the ways that the WISN can be used in making staffing decisions.

Finally, the findings in Chapter 4 highlight the importance of job-related factors arising from nurses' work environments and nurse resiliency as predictive factors on nurses' job attitudes. Job-related factors affect nurses' attitudes and, in turn, nurses' abilities to do their jobs well. The findings also showed that nurses were able to engage in resilient behaviors by letting go of their frustrations, which enabled them to maintain positive job attitudes and to do their jobs well. These findings highlight the need for implementing interventions that promote positive work environments and increased nurse resiliency, improve nurses' job attitudes, and deliver care in ways that may foster the achievement of organizational goals. However, such interventions cannot be implemented in insolation without other interventions that address work environments, because nurses cannot be resilient against extremely adverse working environments. Nevertheless, this dissertation highlights the need for future research focused specifically on nurse resiliency and on interventions that improve it.

In conclusion, future research needs to highlight a variety of topics that were uncovered in this dissertation. These needs include testing the mediating effect of nurses job attitudes in the relationship between nurse staffing and patient outcomes; the integration of quantitative methods, such as multilevel modeling, to understand the various structures and processes that impact patient outcomes; exploring the perspectives of patients in improving outcomes and delivering patient-centered HIV care; examining the use of WISN as a staffing measure in other settings and in comparison with other staffing measures; and the development of interventions

that improve the job-related factors within nurses' work environment that may affect nurse resiliency.

Theory

This dissertation also has implications for the JD-R. There were two key findings from the qualitative study conducted as part of this dissertation that extended beyond the previously described relationships of the JD-R. These findings were the following:

1. Job resources and demands include job factors and the personal factors of the study participants. My findings indicate that these personal factors include nurses' spirituality as well as their resilience and emotional awareness.
2. The relationship proposed in the JD-R is that nurse attitudes would predict outcomes. However, my findings suggest that there may be a bidirectional relationship between attitudes and outcomes in which outcomes, specifically patient outcomes, also influence nurses' attitudes.

Further research guided by the JD-R should explore the effects of personal factors on nurse attitudes and examine the potential bidirectional relationship between attitudes and outcomes. This theory could be further expanded to include these concepts and relationships by quantifying some of the variables that arose in this dissertations' qualitative work, which would help clarify the relationships among constructs of the JD-R.

Practice

The findings of this dissertation point to important implications for practice considerations for clinicians and organizational leaders in Namibia and possibly in other similar settings. The following sections highlight practice implications from this dissertation.

Improving Job-related Factors in the Work Environment

The findings from this dissertation suggest that several job-related factors may impact nurses' attitudes and affect nurses' ability to do their jobs well. Some areas described by nurses for possible intervention are promoting teamwork, recognizing nurses for the work they do, and providing them with the training and resources needed so that they have the information and knowledge to do their jobs well. Organizations and health facilities should consider making investments in these areas to promote better organizational outcomes.

Promotion of Teamwork. In Chapter 4, Nurses described teamwork as being important for promoting positive job attitudes and for increasing their ability to do their jobs well. Teamwork is a major part of nurses receiving support from coworkers, and a busy day could be made better by everyone working together. Promoting environments in which teamwork is encouraged and rewarded for positive teamwork behaviors could improve nurses' attitudes and facilitate their ability to do their jobs well. Interventions to improve teamwork include educational interventions to improve shared mental models, mutual respect and trust, and closed loop communication among health workers (Weller, Boyd, & Cumin, 2014). Educational interventions to promote teamwork have been shown to help staff understand each other's roles and help develop better communication strategies (Weller et al., 2014). Organizations and facilities should creatively identify and develop interventions that promote teamwork among their staff to promote the development of more supportive relationships between coworkers.

Recognition of Nurses. In Chapter 4, nurses described positive job attitudes when leaders or other authorities recognized them for their work. This is another area for intervention within and across Namibian public health facilities that would involve developing a system for providing ongoing recognition of nurses' work. Facilities could consider such programs as the

international DAISY Award program, a system in which administrators, peers, or patients can nominate nurses for their work so that they can be honored in a public celebration (Lefton, 2014). Health facilities should build and implement programs to recognize nurses and other health care staff for the work that they do, as this will improve nurses job attitudes and, in turn, their ability to do their jobs well.

Training and Knowledge Resources. Nurses identified the need to be appropriately trained for their jobs as something that was important in shaping their positive job attitudes and their ability to execute their jobs well. Given the limited scope of nurses' learning in nursing school, NIMART training was singled out as one type of training that helped nurses feel more confident in managing HIV care, especially the complicated ART medication regime. Continuing to invest in NIMART and other types of training for nurses can help promote nurses' positive attitudes about their jobs. Also, experienced nurses identified inexperienced staff as a stressor at work, as inexperienced nurses often ask many questions of experienced nurses that require in-depth explanation and guidance. Providing timely training for new nurses could thus help promote positive attitudes among these two groups of nurses, who must work together on a daily basis. Nurses also identified the need for continued updates to their training, including NIMART, as practice guidelines change frequently. This ongoing training requires sustainable investments in nurses so that they remain up to date on clinical practices, feel confident and competent in their jobs, improve their attitudes, and feel supported in doing their jobs well. At facility levels, organizations should invest in trainings for nurses that increase their knowledge and help them do their jobs well.

Material Resources. My findings also indicated the importance of providing access to material resources to improve nurses' attitudes toward their jobs. Nurses highlighted the

importance of several resources that would help them do their jobs well: providing housing accommodations, allocating guideline booklets (guide to care) for each nurse, providing access to clean water at the health facility, improving the facility's infrastructure (i.e., having a good layout of rooms at the facility), and having access to a car or transportation at the health facility that nurses can use when they go on outreach trips to bring care into the communities. Engaging nurses in a discussion about prioritizing the material resources and then developing a plan for making investments in them will let the nurses know they have been heard. Organizations and facilities could consider how they might make strategic investments in key material resources within their budgets to improve nurses' attitudes and their ability to do their jobs well.

Nurse Staffing. The staffing of nurses is vital in the delivery of health care. The findings presented in Chapter Three indicated that a sufficient level of nurse staffing, as determined by the WISN, was associated with better VLD. Documentation, in general, is an important part of nurses' jobs, and sufficient nurse staffing helps ensure that nurses can document this important outcome of HIV care. Nurse staffing was also addressed in the findings presented from Chapter 4, which indicated that nurses described their jobs as frustrating and stressful when there were insufficient numbers of nurses to care for patients. Nurses also emphasized high workloads as a major stressor that required them to work long hours and negatively affected their job attitude. Staffing decisions based on the WISN can help leaders of organization and facilities support nurses to do their jobs well.

Nurse Resiliency

The findings reported in Chapter 4 indicate that nurses' personal resiliency helped them to deal with adversity at work. Leaders can, in practice, build on these findings to capitalize on nurses existing resilient qualities. It is important to continue build qualities of resiliency in

nurses' work and provide them educational opportunities to learn about and expand upon their personal resiliency. Building resiliency in the work environment is especially important when coping with non-modifiable work factors, such as negative patient rapport, a lack of financial resources to increase nurse staffing levels, or investments in material resources. Leaders can promote open discussions about these concerns in staff meetings, share information appropriately, and work together to develop strategies to address these complex concerns.

The findings in Chapter 4 indicate that nurses have two main personal characteristics that impact their attitudes toward their jobs, the first being their resiliency and emotional awareness and the second being their spirituality. Past research indicates the importance of creating space for debriefings after moral distress incidents at work (Keene, Hutton, Hall, & Rushton, 2010), encouraging work-life balance for nurses (Hart et al., 2014), enabling spirituality at work (McDonald et al., 2012), practicing mindfulness based stress reduction (Foureur, Besley, Burton, Yu, & Crisp, 2013), and cultivating work environments that promote the use of humor and gratitude (Hart et al., 2014). Interventions that promote nurse resiliency should be tailored to the specific needs of Namibian nurses, which may differ from facility to facility and even from nurse to nurse. Baseline assessments of nurses' levels of resiliency and their specific needs should be done before implementing nurse resiliency interventions. Practice leaders should find ways within their budgets to incorporate interventions that continue to promote nurse resiliency.

Policy

The findings of this dissertation imply and support several policy interventions that could be made in Namibia or similar countries at a regional or national level. These findings support policies related to nurse staffing, policies related to job-related factors in the nurse work environment, and policies related to nurses' personal factors. These policies are meant to

improve nurse staffing and nurses' attitudes so that nurses can perform their jobs better and contribute to better organizational outcomes.

Policies Related to Nurse Staffing

This dissertation's findings suggest that the WISN should continue to be used as a tool for making staffing decisions. Sufficient nurse staffing by the WISN (a ratio of 0.75-1.99) was associated with better VLD than was insufficient nurse staffing (<0.74). Beyond direct improvements to VLD, staffing based on the WISN would give nurses more manageable workloads. The qualitative findings of this dissertation indicate that high workloads lead to more negative job attitudes and, in turn, lead to an inability for nurses to do their jobs well. Therefore, staffing sufficiently based on the WISN supports more VLD and more manageable workloads. This finding supports the development of policies at a national level that use the WISN tool to sufficiently staff Namibia health facilities with nurses. In settings similar to Namibia, this dissertation's findings support use of the WISN tool to make staffing decisions. Policies should support the use of WISN to make staffing decisions in outpatient nurse staffing settings in order to allow nurses to do their jobs better.

Policies About Job-Related Factors in the Nursing Work Environment

This dissertation's findings imply that support from coworkers, access to material resources, access to information, and patient rapport are also associated with improved nurse attitudes, and, in turn, are associated with nurses' ability to do their jobs well. Therefore, national-level policies in Namibia or similar settings should consider investments to improve job-related factors in the nursing work environment as it relates to the above themes. For example, such investments might include the support of training to improve teamwork among nursing staffing; making investments in material resources, such as housing accommodations for

nurses; access to clean water; investments in cars and transport at facilities; and patient care needs, such as medications and health supplies (thermometer, blood pressure cuff, or stethoscope); and network or other communication technologies.

Improving nurses' access to information through policy should be done by developing policies that create opportunities for nurses to invest in their knowledge through trainings. NIMART training should be continued to be given to nurses, as nurses found that this was a key training that improved their abilities to deliver HIV-related medications. Finally, policies should include zero tolerance for violence against nurses, as nurses cited violence and poor relations with patients as a major stressor at work.

Policies Related to the Personal Factors of Nurses

Nurses' spirituality and nurses' resilience and emotional awareness were perceived by nurses to be associated with improved job attitudes and, in turn, their ability to do their jobs well. On a national level across public health facilities, I recommend that Namibia and other similar settings invest in improving nurses' well-being. Such policies could allow for a space where nurses can practice their spirituality, as many nurses use spirituality as a coping mechanism to adversity at work. My recommendation also involves making practice-level investments to build nurse resiliency, such as holding debriefings after events that cause moral distress at work, encouraging work-life balance among nurses, and cultivating work environments that promote gratitude and humor. Making policies that support nurses' well-being will likely improve their attitude toward their job and, in turn, their ability to do their jobs well.

Conclusion

This dissertation examined the relationships among nurse staffing, nurse attitudes, and organizational outcomes for Namibian nurses working in public health facilities. Paper 1

(Chapter 2) presented a scoping review of the literature to understand the relationships among nurse staffing, nurse attitudes, and organizational outcomes in outpatient settings. The findings of this paper indicated that improved nurse staffing in outpatient settings, regardless of how it is measurement, improves several organizational outcomes, including chronic disease management, nurse turnover, and costs. Also, one measure of nurse staffing, nurse staffing adequacy, was reported to be positively associated with nurses' job attitudes. A strong relationship was reported between nurses' job attitudes and organizational outcomes—as nurses' job attitudes improve, so too do organizational outcomes. However, there is limited research available that examines the relationship between nurse staffing and patient outcomes in outpatient settings.

Paper 2 presented the findings of a secondary analysis of data gathered in 66 health care facilities in Namibia to examine the relationship between nurse staffing and two key organizational outcomes of HIV care, VLD and VLS. The findings of this analysis indicated a positive relationship between nurse staffing, as measured by the WISN ratio, and VLD. With a variety of control variables, this relationship remained significant when measured continuously and categorically. The findings indicated no significant relationship between the WISN ratio and VLS; however, further research is needed to better understand how nurse staffing and other factors affect VLS. Very few facilities had high levels of properly documented viral loads, which indicates that improvements in VLD could be achieved by improving staffing by WISN.

Paper 3 presented the results of qualitative interviews with Namibian nurses to examine their perceptions about job attitudes, the job-related factors that affected their job attitudes, and the ways that their job attitudes affected their ability to do their jobs well. The findings of directed content analysis indicated that nurses describe their job attitudes as empowerment, motivation, pride, satisfaction, burnout, dissatisfaction, and frustration. Also, the nurses in my

sample perceived that job-related factors, specifically support from coworkers, their workload, material resources, access to information, and patient rapport all contributed to their attitudes about their jobs. Nurses also described the importance of their personal resiliency and spirituality, which promoted their positive job attitudes and helped them cope with adversity at work. Lastly, nurses described how their job attitudes affected their ability to do their jobs well. In particular, nurses noted that positive job attitudes increased their drive to learn more knowledge, decrease their mistakes at work, decrease conflicts with peers, increase their drive to coach patients on medication adherence, increase their focus on work, and decrease their missed nursing care.

The major findings of this dissertation point to several implications for research, theory, practice, and policy-making. Future research should examine the possible mediation effect of nurse attitudes on the relationship between nurse staffing and organizational outcomes in outpatient settings to better understand these relationships and to inform the relationships, as proposed in the JD-R. Future research should also explore use of the WISN, as this study provides new insights about its usefulness in measuring of nurse staffing. Policymakers and key stakeholders in Namibia should make investments in nurses, such as staffing sufficiently based on the WISN, promoting teamwork, recognizing nurses for their work, investing in continued trainings so that nurses have the information and knowledge that they need to do their jobs well, and investing in the material resources that nurses need to do their jobs. My findings indicate that investing in these areas could improve nurses' attitudes and their ability to do their jobs well. Also, specific to HIV care, staffing sufficiently as assessed by WISN could improve the organizational outcomes of patient VLD. Lastly, interventions that promote and improve nurses'

resilience, emotional awareness, and spirituality will help them overcome challenges at work and evoke positive nurse attitudes that support nurses in doing their jobs well.

Nurses are key HIV care providers in the Namibian health system. They prescribe and manage HIV patients' medication regimes, coordinate HIV patients' overall care plan, and form close and lasting relationships with their patients that can help improve the outcomes of their patients, their health system, and their society at large. Promoting strategies to improve nurse staffing and nurses' job attitudes can provide a strong foundation for nurses to do their jobs well and deliver quality HIV care to Namibians.

APPENDIX A: SEARCH STRATEGY DOCUMENTATION

Database: PubMed (MEDLINE)

Set #		Results
1	"Nurses"[Mesh] OR nurses[TIAB] OR nurse[TIAB] OR "nursing assistants"[TIAB] OR "nursing staff"[TIAB] OR "nursing personnel"[TIAB]	
2	"Ambulatory Care"[Mesh] OR "Primary Care Nursing"[Mesh] OR ambulatory[TIAB] OR "urgent care"[TIAB] OR outpatient[TIAB] OR clinic[TIAB] OR clinics[TIAB] OR "primary care"[TIAB]	
3	1 AND 2	
4	"Attitude of Health Personnel"[Mesh] OR attitude[TIAB] OR attitudes[TIAB] OR "Burnout, Professional"[Mesh] OR burnout[TIAB] OR "Job Satisfaction"[Mesh] OR "job satisfaction"[TIAB] OR "work satisfaction"[TIAB] OR "Work Engagement"[Mesh] OR "work engagement"[TIAB] OR "staff engagement"[TIAB] OR "employee engagement"[TIAB] OR "nurse engagement"[TIAB] OR "Motivation"[Mesh] OR motivation [TIAB]	
5	"Patient Outcome Assessment"[Mesh] OR "patient outcomes"[TIAB] OR "Patient Satisfaction"[Mesh] OR "patient satisfaction"[TIAB] OR "Personnel Turnover"[Mesh] OR turnover[TIAB] OR "Absenteeism"[Mesh] OR absenteeism[TIAB]	
6	4 AND 5	
7	"Personnel Staffing and Scheduling"[Mesh] OR staffing[TIAB]OR workload[TIAB]	
8	6 OR 7	

9	3 AND 8 Limit to English	
	((((("Nurses"[Mesh] OR nurses[TIAB] OR nurse[TIAB] OR "nursing assistants"[TIAB] OR "nursing staff"[TIAB] OR "nursing personnel"[TIAB])) AND ("Ambulatory Care"[Mesh] OR "Primary Care Nursing"[Mesh] OR ambulatory[TIAB] OR "urgent care"[TIAB] OR outpatient[TIAB] OR clinic[TIAB] OR clinics[TIAB] OR "primary care"[TIAB]))) AND (((((("Attitude of Health Personnel"[Mesh] OR attitude[TIAB] OR attitudes[TIAB] OR "Burnout, Professional"[Mesh] OR burnout[TIAB] OR "Job Satisfaction"[Mesh] OR "job satisfaction"[TIAB] OR "work satisfaction"[TIAB] OR "Work Engagement"[Mesh] OR "work engagement"[TIAB] OR "staff engagement"[TIAB] OR "employee engagement"[TIAB] OR "nurse engagement"[TIAB] OR "Motivation"[Mesh] OR motivation [TIAB])) AND ("Patient Outcome Assessment"[Mesh] OR "patient outcomes"[TIAB] OR "Patient Satisfaction"[Mesh] OR "patient satisfaction"[TIAB] OR "Personnel Turnover"[Mesh] OR turnover[TIAB] OR "Absenteeism"[Mesh] OR absenteeism[TIAB]))) OR ("Personnel Staffing and Scheduling"[Mesh] OR staffing[TIAB]OR workload[TIAB]))	1486

Database: CINAHL

Set #		Results
1	MH "Nurses+" OR TI (nurses OR nurse OR "nursing assistants" OR "nursing staff" OR "nursing personnel") OR AB (nurses OR nurse OR "nursing assistants" OR "nursing staff" OR "nursing personnel")	
2	(MH "Ambulatory Care") OR (MH "Ambulatory Care Facilities") OR (MH "Primary Health Care") OR TI (ambulatory OR "urgent care" OR outpatient OR clinic OR clinics OR "primary care") OR AB (ambulatory OR "urgent care" OR outpatient OR clinic OR clinics OR "primary care")	
3	1 AND 2	
4	(MH "Attitude of Health Personnel") OR (MH "Burnout, Professional") OR (MH "Job Satisfaction") OR (MH "Work Engagement") OR (MH "Motivation") OR TI (attitude OR attitudes OR burnout OR "job satisfaction" OR "work satisfaction" OR "work engagement" OR "staff engagement" OR "employee engagement" OR "nurse engagement" OR	

	motivation) OR AB (attitude OR attitudes OR burnout OR “job satisfaction” OR “work satisfaction” OR “work engagement” OR “staff engagement” OR “employee engagement” OR “nurse engagement” OR motivation)	
5	(MH "Outcomes (Health Care)") OR (MH "Patient Satisfaction") OR (MH "Personnel Turnover") OR (MH "Absenteeism") OR AB (“patient outcomes” OR “patient satisfaction” OR turnover OR absenteeism) OR TI (“patient outcomes” OR “patient satisfaction” OR turnover OR absenteeism)	
6	4 AND 5	
7	(MH "Personnel Staffing and Scheduling") OR AB(staffing OR workload) OR TI(staffing OR workload)	
8	6 OR 7	
9	3 AND 8 Limit to English	
	(((MH "Personnel Staffing and Scheduling") OR AB(staffing OR workload) OR TI(staffing OR workload)) AND (S6 OR S7)) AND (S3 AND S8)	719

Database: Global Health

Set #		Results
1	DE "nurses" OR TI (nurses OR nurse OR “nursing assistants” OR “nursing staff” OR “nursing personnel”) OR AB (nurses OR nurse OR “nursing assistants” OR “nursing staff” OR “nursing personnel”)	

2	(DE "outpatient services") OR (DE "primary health care") OR TI (ambulatory OR “urgent care” OR outpatient OR clinic OR clinics OR “primary care”) OR AB (ambulatory OR “urgent care” OR outpatient OR clinic OR clinics OR “primary care”)	
3	1 AND 2	
4	(DE "attitudes to work") OR (DE "burnout") OR (DE "work satisfaction") OR (DE "motivation") OR TI (attitude OR attitudes OR burnout OR “job satisfaction” OR “work satisfaction” OR “work engagement” OR “staff engagement” OR “employee engagement” OR “nurse engagement” OR motivation) OR AB (attitude OR attitudes OR burnout OR “job satisfaction” OR “work satisfaction” OR “work engagement” OR “staff engagement” OR “employee engagement” OR “nurse engagement” OR motivation)	
5	(DE "quality") OR (DE "turnover") OR AB (“patient outcomes” OR “patient satisfaction” OR turnover OR absenteeism) OR TI (“patient outcomes” OR “patient satisfaction” OR turnover OR absenteeism)	
6	4 AND 5	
7	AB (staffing OR workload) OR TI(staffing OR workload)	
8	6 OR 7	
9	3 AND 8 Limit to English	107

APPENDIX B: DEFINITIONS OF NURSE STAFFING USED IN THIS REVIEW

Patient-to-nurse ratios	The number of patients cared for by one nurse. The exact ratio often varies based on the type of unit and the acuity of patients cared for on the unit where nurses work (i.e., ICU nurse have a patient to nurse ratio of 2:1, while a medical surgical unit may have a ratio of 5:1) (Min & Scott, 2016)
Full-time equivalent (FTE) employment	*Full-time equivalent (FTE) employment* is another administrative tool used to reflect the number of employees working full time by adding up the full times workers, and the corresponding ratio of the part time workers (e.g., one part time workers might be 0.5 of a full-time worker). This common organizational metric is typically used to estimate staffing numbers for budgeting purposes by determining the "equivalent" number of nurses working full time in reference to the number of patients being cared for (Jones, Kovner, & Mose, 2019).
Nursing hours per patient day (HPPD)	HPPD is calculated by dividing the total number of productive hours of care delivered by various types of nursing staff based on the number of patient days, or the total number of days any one patient stays in the hospital during a calendar month. This measure is the most commonly used measure in nurse staffing research (Min & Scott, 2016).
Nursing skill mix/ proportion of nurses to total staff	Skill mix is the proportion of registered nurses working at a given time divided by the total nursing staff available during the same time period, with "total nursing staff" including registered nurses, licensed practical nurses and unlicensed assistive personnel (Min & Scott, 2016)
Perceived staffing adequacy	Perceived staffing adequacy is a staffing measure based on how health care workers (often nurses) perceive staffing to be (Min & Scott, 2016).This can be measured via a survey item, or via qualitative interviews.
Types of health workers staffed	This was defined as a what type of staff made up the clinic (e.g., 2 NPs, 2 RNs and a physician). It is usually measured in comparative studies which would compare staffing of one type of health care worker to another.
Nurse vacancies	Nurse vacancies are the number of unoccupied nursing job positions at a facility.
Nurse staffing in public facilities	Nurse staffing in public facilities was the number of nurses a government would staff at public facilities. This was more commonly a measure in countries with large public health systems.
Agency and float nurse use	Use of agency and float nurses increase in times of vacancies or staffing shortages, and as such are used as a measure of nurse staffing.
Presence of nurse	This was a measure of present of a least one nurse on the health care team.

APPENDIX C: DEFINITION OF TYPES OF NURSING STAFF

Nurse practitioners (NPs)	Nurses who are able to diagnose, prescribe, undertake a range of procedures and develop and lead whole services (All-Party Parliamentary Group on Global Health, 2016). These nurses typically have advanced degrees or graduate training obtained at colleges and universities that prepare them to preform specific competencies. They were typically RNs first, before advancing their education to an advanced practice position.
Registered nurses (RN)	A fully trained nurse with an official state certificate of competence and with a license from an accredited board in the country or state in which they practice (Oxford Dictionaries, 2012)
Enrolled nurses (EN)	Those educated in the vocational and technical education sector (McEwan, 2008). They typically work under the supervision of a registered nurse.
Licensed practical nurses (LPNs)	Provides care to sick, injured, convalescent, or disabled persons under the direction of a registered nurse. They are licensed by an accredited board in the country or state in which they practice (Huynh, Alderson, Nadon, & Kershaw-Rousseau, 2011).
Nursing assistants (NAs)	Health workers who help patients with activities of daily living including eating, bathing, dressing, and getting around. They are often certified workers, but they typically do not hold licenses. (US Department of Health and Human Services, 2004)
Agency nurses	Nurses that come from outside of the facility by a company to meet staffing needs at the facility.
Float nurses	Nurses that came from an outside clinic or unit to meet staffing needs.

APPENDIX D: INDIVIDUAL STUDY DATA EXTRACTION TEMPLATE

Citation:

Purpose of Study:

Country of Origin:

Study Design:

Theory/ Framework:

Setting and Sample:

Staffing Measure:

Nurse Attitude Measure:

Outcome Measure:

Findings:

Comments:

APPENDIX E: STAFFING MEASURES AND OUTCOMES

Citation	Staffing Measure	Outcome Measure
Aita et al., 2001	FTEs; types of health workers staffed	Physician workload
Ammi et al., 2017	FTEs	Patient satisfaction
Barber et al., 2007	Nurse staffing in public facilities	Quality of care
Basu et al., 2015a	Types of health workers staffed (NP vs physician)	Costs
Basu et al., 2015b	Types of health workers staffed (RN vs LPN vs physician)	Costs
Chuang et al., 2017	Perceived staffing adequacy	Turnover; burnout; ability to deliver care
Dunbar et al., 2019	Perceived staffing adequacy (qualitative)	Teamwork, nurse competency
Edwards et al., 2018	Perceived staffing adequacy	Burnout
Friese & Himes-Ferris, 2013	Perceived staffing adequacy	Job satisfaction
Friese et al., 2012	Perceived staffing adequacy	Nurse reported chemotherapy exposure
Friese et al., 2016	Perceived staffing adequacy	Job satisfaction; quality of care
Gardner & Walton, 2011	Perceived staffing adequacy	Job satisfaction
Graveley & Littlefield, 1992	Types of health workers staffed (physicians vs physicians & NPs vs NPs)	Maternal and neonatal physiological variables; costs
Griffiths et al., 2011	FTEs	Quality of care
Griffiths et al., 2010	FTEs	Non-elective hospital admissions
Gruber et al., 2008	Nurse vacancies	Number of patients seen a day
Huang et al., 2017	Patient-to-nurse ratios	Number of patients seen a day
Ireland et al., 2004	Nurse vacancies	Turnover
Jackson et al., 2011	Proportion of nurses to total staff	Diabetes outcomes (HbA1c)
Lamkin et al., 2001; Lamkin et al., 2002	Perceived staffing adequacy; agency nurse use; float nurse use	Quality of care
Levine et al., 2017	FTEs	Depression outcomes; antidepressant receipt; adequacy of antidepressant receipt; psychotherapy receipt & engagement
Lukewich et al., 2016	Patient-to-nurse ratios; presence of nurse	Diabetes outcomes; HbA1c; fasting plasma glucose; low-density lipoprotein
March et al., 2017	Proportion of nurses to total staff	Team involvement in community activities

Citation	Staffing Measure	Outcome Measure
Matthews, 2005	Types of health workers staffed	Costs
Munyewende et al., 2014	Perceived staffing adequacy	Job satisfaction; workload; additional tasks
Norful et al., 2018	Perceived staffing adequacy	Physician workload; quality of care; patient safety
Pietruszewski et al., 2014	Types of health workers staffed (RN vs LPN vs MA)	Depression outcomes; depression remission
Pittman et al., 2016	Types of health workers staffed - qualitative interviews	Costs; patient centeredness
Russell et al., 2017	FTEs	Turnover
Thompson et al., 1982	Types of health workers staffed (NPs vs physicians)	Wait times; quality of care; costs; patient satisfaction
van der Biezen et al., 2016	Types of health workers staffed (NPs vs physicians)	Physician workload; number of patient seen
Vindigni et al., 2014	Nurse staffing in public facilities	Burnout; maternal patient outcomes
Zhao et al., 2019	FTEs; agency nurse use	Population years of life lost; costs

APPENDIX F: NURSES' ATTITUDES ABOUT WORK, MEASURES, PREDICTORS AND OUTCOMES

Citation	Nurse Attitude Measure	Staffing Measure	Nurse Attitude Outcomes
Celentano, 1978	Job satisfaction-survey	Not measured	Intent to change jobs
Delobelle et al., 2011	Job satisfaction-survey	Not measured	Turnover; intent to change job
Lelli et al., 2015	Job satisfaction-Miener nurse practitioner job satisfaction scale & Dempster practice behavior scale	Not measured	Intent to leave position
Perry et al., 2018	Job satisfaction-practice environment scale & nursing work index & Army provider level satisfaction survey	Not measured	Number of falls; turnover cognitions
Plant & Coombes, 2003	Burnout-qualitative interviews; stress-qualitative interviews	Not measured	Sick leave
Poghosyan et al., 2017	Job satisfaction-single item	Not measured	Intent to leave position

APPENDIX G: NURSE STAFFING MEASURES

Patient-to-nurse ratios	The number of patients cared for by one nurse. The exact ratio often varies based on the type of unit and the acuity of patients cared for in the unit where nurses work (e.g., ICUs have a patient-to-nurse ratio of 2:1, whereas a medical surgical unit may have a ratio of 5:1) (Min & Scott, 2016).
Full-time equivalent (FTE) employment	Full-time equivalent (FTE) employment is another administrative tool used to reflect the number of employees working full time by adding up the full times workers and the corresponding ratio of the part time workers (e.g., one part-time worker might be equivalent to 0.5 of a full-time worker). This common organizational metric is typically used to estimate staffing numbers for budgeting purposes by determining the "equivalent" number of nurses working full time in reference to the number of patients being cared for (Jones et al., 2019).
Nursing hours per patient day (HPPD)	HPPD is calculated by dividing the total number of productive hours of care delivered by various types of nursing staff based on the number of patient days, defined as the total number of days any one patient stays in the hospital during a calendar month. This is the most commonly used measure in nurse staffing research (Min & Scott, 2016).
Nursing skill mix/proportion of nurses to total staff	Skill mix is the proportion of registered nurses working at a given time divided by the total nursing staff available during the same time period, with "total nursing staff" including registered nurses, licensed practical nurses, and unlicensed assistive personnel (Min & Scott, 2016).
Perceived staffing adequacy	Perceived staffing adequacy is a staffing measure based on how health care workers (often nurses) perceive the adequacy of staffing (Min & Scott, 2016). This can be measured via a survey item or via qualitative interviews.
Types of health workers staffed	This was defined as which types of staff made up the clinic (e.g., 2 NPs, 2 RNs and a physician). It is usually measured in comparative studies, which would compare staffing of one type of health care worker to another.
Nurse vacancies	Nurse vacancies are the number of unoccupied nursing job positions at a facility.
Nurse staffing in public facilities	Nurse staffing in public facilities was the number of nurses a government would staff at public facilities. This measure was more commonly used in countries with large public health systems.
Agency and float nurse use	Use of agency and float nurses increase in times of vacancies or staffing shortages and, as such, are used as a measure of nurse staffing.
Presence of nurse	This was a measure of present of a least one nurse on the health care team.

APPENDIX H: STEPS OF CALCULATING THE WORKLOAD INDICATOR OF STAFFING NEEDS

Step of the WISN Method	Explanation of Step
1. Determine cadre (health worker type) and health facility type	Facility administrators identify the type of health worker of focus and their facility type. For the WISN analysis that serves as the secondary data for this analysis, it was the Namibian Ministry of Health Officials who choose priority cadres. An example of the health worker cadres that could be selected are doctors, nurses, midwives, and community health workers; some examples of facility types that could be selected are hospitals, health centers, and clinics. These can be any type of health care workers and any type of facility depending on the needs of the person conducting the WISN.
2. Estimate available work time	The total amount of time (usually in minutes) a health worker has available in one year for their work, accounting for authorized and unauthorized absences. This value can be expressed in days per year per health worker or hours per year per health worker. The number is typically calculated by determining the total number of days (or hours) a health worker actually works in a year, minus the total number of days (or hours) a health worker is absent in a year (for whatever reason, training, sickness, public holidays, annual leave, etc.). After authorized absences are subtracted, the available work time is how many hours a year a health worker is actually at work performing their job.
3. Define workload components	The tasks that take up most of each health worker's daily working time. These components are broken down into health service activities, support activities, and additional activities. Health services activities are the tasks that all health workers perform directly to do their jobs (e.g., antenatal care, taking vital signs). Support activities are activities where all health workers of a specific cadre are involved, and additional activities are activities where only some of those health workers are involved (e.g., only one nurse does the monthly schedule where all nurses attend the staff meeting). Usually only the top four most important health services and the top three most important support and additional activities are defined to eliminate calculating all the small tasks that comprise a negligible amount of time in the final workload.
4. Set activity standards	The time it takes a well-trained, skilled, and motivated worker to perform an activity or service to professional standards, a standard usually determined by observation (e.g., antenatal care; 20 min per client). There is not a set standard for how this observation process is completed, and it can even be supplemented with interviews of health workers, who can express their estimates for the time these tasks take. There are two types of activity standards, service standards and allowance standards. These go into the final WISN calculation differently, so they must be calculated separately. • **Service standards** are activity standards for health services activities, assessed as the amount of time it would take a well-trained health worker to provide or deliver a health service activity. Service standards can be expressed as unit time (e.g., spending 10 minutes to provide care per pregnant woman) or rate of working (e.g., providing care to 18 pregnant women in a three-hour time period). While both could be used in the WISN, the unit must be the same for the entire implementation of the WISN. Service standards are measured from the start of one activity to the start of the next activity to account for set-up and clean-up time. All standards should be set locally to account for the local differences in time that tasks take to complete. • **Allowance standards** are the time it takes for support activities (e.g., recording and reporting, meetings, home visits). To complete this step, all workload components are listed, as is the time it takes to perform each activity (usually "time" comes from observations or interviews). These components are then converted to a percentage of working time for each component out of total working time, and the percentages are added together to create the category allowance standard, which will be used later (e.g., it takes 2 hours a month for required meetings which is 1.6% of the total working time).
5. Establish standard workloads	The amount of work within a health service workload component that one health worker could do in a year, if the only task were the only one they did their whole time working. The formula to calculate the standard workload is expressed as available work time divided by total time or as available work time multiplied by rate of working. This step is completed for each service activity, and the output represents how much of that activity has been completed (e.g., if family planning takes 30 minutes per client, a health worker could see 3024 clients in a year).

Step of the WISN Method	Explanation of Step
6. Calculate allowance factors	This step takes the standard workload for all the components above and accounts for the time health workers take to do additional tasks that cannot be measured. There are two types of factors: • **Categorical allowance factor** (CAF) is a multiplier used to calculate the total number of health workers required for both health service and support activities. (e.g., if you need one full-time midwife to cover only health service activities, you would need 1.2 midwives to cover service and support activities) • **Individual allowance factor** (IAF) is the staff requirement to cover additional activities of a certain type members. It is added to the total required number of staff members in the finals step of the WISN (e.g., you need 0.13 midwives to cover additional activities of health workers, so you would need 0.13 added to your final WISN required number of staff members).
7. Determine staff requirements, e.g., WISN ratio	For health service activities, divide the annual workload for each component by the respective standard workload and then add all activities to determine the staff requirement for health service activities. For support or additional activities, the health service activities are multiplied by categorical and individual allowance factors to account for tasks that cannot be measured. The CAS multiples the total FRE requirements for activity standards and then adds the IAS to give a staffing requirement.
8. Analyze and interpret WISN results	There are two options for assessing WISN results: 1) *WISN Difference,* that is, the difference between the number of current and needed health care workers to achieve full staffing (e.g., three health workers short of being fully staffed to meet workload requirements); 2) *WISN ratio,* or the percentage of current health workers in a facility relative to the number needed. This analysis will use the WISN ratio (e.g., WISN ratio of 3.0 indicate that the unit is overstaffed, whereas a WISN ratio of 0.3indicates understaffing to meet workload requirements).

APPENDIX I: "HOW WISN ELEMENTS INTERRELATE" WISN MANUAL (WHO, 2010 P 26)

Workload Group	Workload Components	Activity Standard	Essential for calculating staff requirement
Health service activities	1.	Service standard	Standard Workload
	2.		
	3.		
Support activities	1.	Categorical allowance standard (CAS)	Categorical allowance factor
	2.		
	3.		
		Allowance standards	Allowance factor
Additional activities	1.	Individual allowance standard (IAS)	Individual allowance factor
	2.		
	3.		

APPENDIX J: CONSENT FORM

University of North Carolina at Chapel Hill
Consent to Participate in a Research Study
Adult Participants
Consent Form Version Date: _____
IRB Study # 19-1188
Title of Study: Nurses' Work and How it Impacts HIV Outcomes in Namibia
Principal Investigator: Gill Adynski
Principal Investigator Department: School of Nursing
Principal Investigator Phone number:+1 (919) 843-4749
Principal Investigator Email Address: litynski@email.unc.edu
Faculty Advisor: Cheryl Jones
Faculty Advisor Contact Information: +1 (919) 966-5681

Funding Source and/or Sponsor: Rita and Alex Hillman Foundation

Hello, my name is Gillian Adynski, and I am a PhD student at the University of North Carolina at Chapel Hill in the School of Nursing. I am working with IntraHealth International on this project. The purpose of today's conversation is to learn more about your work environment, and your feelings/ attitudes about your job. This interview is part of my dissertation project evaluating the job demands and resources of nurses in Namibia. I'd like to remind you that today's conversation is completely voluntary. The conversation will be audio recorded, but I will not record anything without your consent. Participation in this interview will last approximately 45 minutes. There are little to no risks for participating in this interview. The only risk is if your confidentiality was broken, and someone found out you participated in this interview when you did not want anyone to know. This will be minimalized by taking your names, and other information out of the interviews before we even start to analyze them. You may not receive direct benefit from participating but this study will contribute to generalizable knowledge on nurses' attitudes towards their work. You do not need to answer any question you do not wish to answer, and you may stop the interview at any time or not participate at all. Today's conversation will be audio recorded, and I will take notes. Please also keep in mind that your identifiable information will not be known to anyone other than me and my colleagues working with me on this project. If that all sounds alright, we will get start.

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary.
You may choose not to participate, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of this research study is to understand how nurses describe their job attitudes, what contributes to their job attitudes and what is the impact of their job attitudes on their work. Nurses were selected for this study so that we understand the nurses prospective on their job attitudes. You are being asked to be in this study because you are a nurse who provides HIV services, and we are interested in how nurses' attitudes may impact HIV services.

Are there any reasons you should not be in this study?

You should not be in this study if you choose not to be for any reason or if you are not willing to have your interview audio-recorded

How many people will take part in this study?
A total of approximately 18 people at 18 institutions will take part in this study, including approximately 1 people from this institution.

How long will your part in this study last?

This is approximately a 45 minutes interview.

What will happen if you take part in the study?
To participate in this study, we will begin by going over a small sheet that asks for some general information about you. Then we will start an interview where I ask you questions about your attitudes towards your job. The interview will be recorded. The interview will last for approximately 45 minutes. You may also choose to not answer any individual question or stop the entire interview at any point. After the interview is complete, it will be analyzed alongside other nurse interviews to learn more about how nurses perceived their job attitudes.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. There is little chance you will directly benefit from being in this research study.

What are the possible risks or discomforts involved from being in this study?

There are little to no risks for participating in this interview. The only risk is if your confidentiality was broken, and someone found out you participated in this interview when you did not want anyone to know. This will be minimalized taking your names, and other information out of the interviews before we even start to analyze them.

How will information about you be protected?

Participants will not be identified in any report or publication about this study. We may use de-identified data from this study in future research without additional consent.

Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is

ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies (for example, the FDA) for purposes such as quality control or safety.

- All audio recordings will be deleted after the information is written down from them. When we write down all information from them, we don't include any identifiable information, like your name or the place you work at.
- The information we write down will be stored on a secure place, on computers that are password protected.

Check the line that best matches your choice:

_____ OK to record me during the study

_____ Not OK to record me during the study

What if you want to stop before your part in the study is complete?
You can withdraw from this study at any time, without penalty. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped.

Will you receive anything for being in this study?
You will not receive anything for taking part in this study.
Will it cost you anything to be in this study?
It will not cost you anything to be in this study.

Who is sponsoring this study?
This research is funded by the Rita and Alex Hillman Foundation. This means that the research team is being paid by the sponsor for doing the study. The researchers do not, however, have a direct financial interest with the sponsor or in the final results of the study.

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions about the study (including payments), complaints, concerns, or if a research-related injury occurs, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Participant's Agreement:

If you have read the information provided above. And you have asked all the questions you have at this time.

Do you agree to participate for in this study?

Do you agree to be audio recorded for this study?

APPENDIX K: DEMOGRAPHIC DATA FORM

Question

1. Which type of nurse certification do you hold?
    a. Enrolled nurse
    b. Registered nurse

2. Did you attend a university to get your nursing degree?
    a. Yes
    b. No

3. What year did you complete your nursing education? _____

4. Are you registered with the Health Professional Council of Namibia?
    a. Yes
    b. No

5. How many years of experience do you have as a nurse? _____

6. What type of facility do you work at?
    a. Hospital
    b. Health center
    c. Clinic

7. How long have you worked at your current facility? _____

8. Did you receive NIMART training?
    a. Yes
    b. No

APPENDIX L: SEMI-STRUCTURED INTERVIEW

How does that feel?
How do you think about that?
Expand more upon…

1. Tell me about your work as a nurse.
    a. What does a typical day look like?
    b. How many patients do you usually see in a day?
    c. How has your work changed over time?
        i. Over what period of time have you seen these changes take place?

2. In general, how do you feel about your job?
    a. What is it about your job that makes you feel X?
    b. Give me an example of something that happened recently that make you feel X.

3. When you go home at the end of the day, what gives you a sense of accomplishment or makes you feel like you had a good/great day at work?
    a. Give me an example of when X occurred.
    b. What made you feel that way?
    c. How often does X happen?

4. When you go home at the end of the day, what makes you feel frustrated or like you had a bad day at work?
    a. Give me an example of when X occurred.
    b. What made you feel that way?
    c. How often does X happen?
    d. How do your feelings of frustration affect your ability to do your job well?

5. What characteristics (aspects or features) of your workplace support you in doing your job well?
    a. Give me an example (or example) of how those supports help you in doing your job?
    b. What is it about (X job conditions) that helps you do your job?
    c. How often do you use these job supports to do your work?

6. What aspects or features of your workplace make it difficult to do your job well?
    a. Give me an example (or example) of how those difficulties made it difficult for you to do your job?
    b. What is it about (X job conditions) is a barrier for you to do your job?
    c. How often do these barriers prevent you from doing your work?

7. What aspects (or features) of your job are inspiring, and make you want to go above and beyond, become more engaged in, or motivated to advance in your job)?
    a.
    b. Give me an example of a time you felt inspired to do your job well (tell me a time recently that you really felt inspired at work)…
    c. What is it about (X feature) that is inspiring?
    d. How often do you experience these inspiring, engaging, and motivating aspects of your work?
    e. How do your feelings of being inspired, engaged, or motivated affect your ability to do your job well?
8. What aspects (or features) of your job are discouraging?
    a. Give an example of a time you felt discouraged to do your job well (tell me a time recently that you really felt inspired at work)…
    b. What is it about (X feature) that is discouraging?
    c. How often do you feel these discouraging aspects of your work?
    d. How do your feelings of discouragement affect your ability to do your job well?

9. Let's talk now about why you entered nursing. What was it about nursing that inspired you to enter the profession?
    a. When did you make the decision to go into nursing?
    b. Describe the moment you knew you wanted to be a nurse.
    c. Was there a specific event that happened, which made you want to go into nursing?
        i. Describe that event in more detail.

10. Describe the training you had that prepared you for your work as a nurse.

    a. What type of training did you receive? What made you choose this type of training?
    b. What areas of your training prepared you to deliver HIV care?
        i. How has that HIV training helped you to do your job?
        ii. Give an example of a time that you relied on your HIV training to do your job?
    c. Probe: If they mention NIMART, ask,
        i. How did NIMART prepare you to deliver HIV care?
        ii. What was it about NIMART that made a difference in the care you deliver to HIV patients?
            1. What about NIMART training worked well?
        iii. In what areas of HIV care delivery do you wish you had more training?
        iv. In what areas would you like to see NIMART training be expanded/enhanced?

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